OSPREY COMBAT AIRCRAFT • 65

US NAVY PBY CATALINA UNITS OF THE ATLANTIC WAR

Ragnar J Ragnarsson

OSPREY COMBAT AIRCRAFT • 65

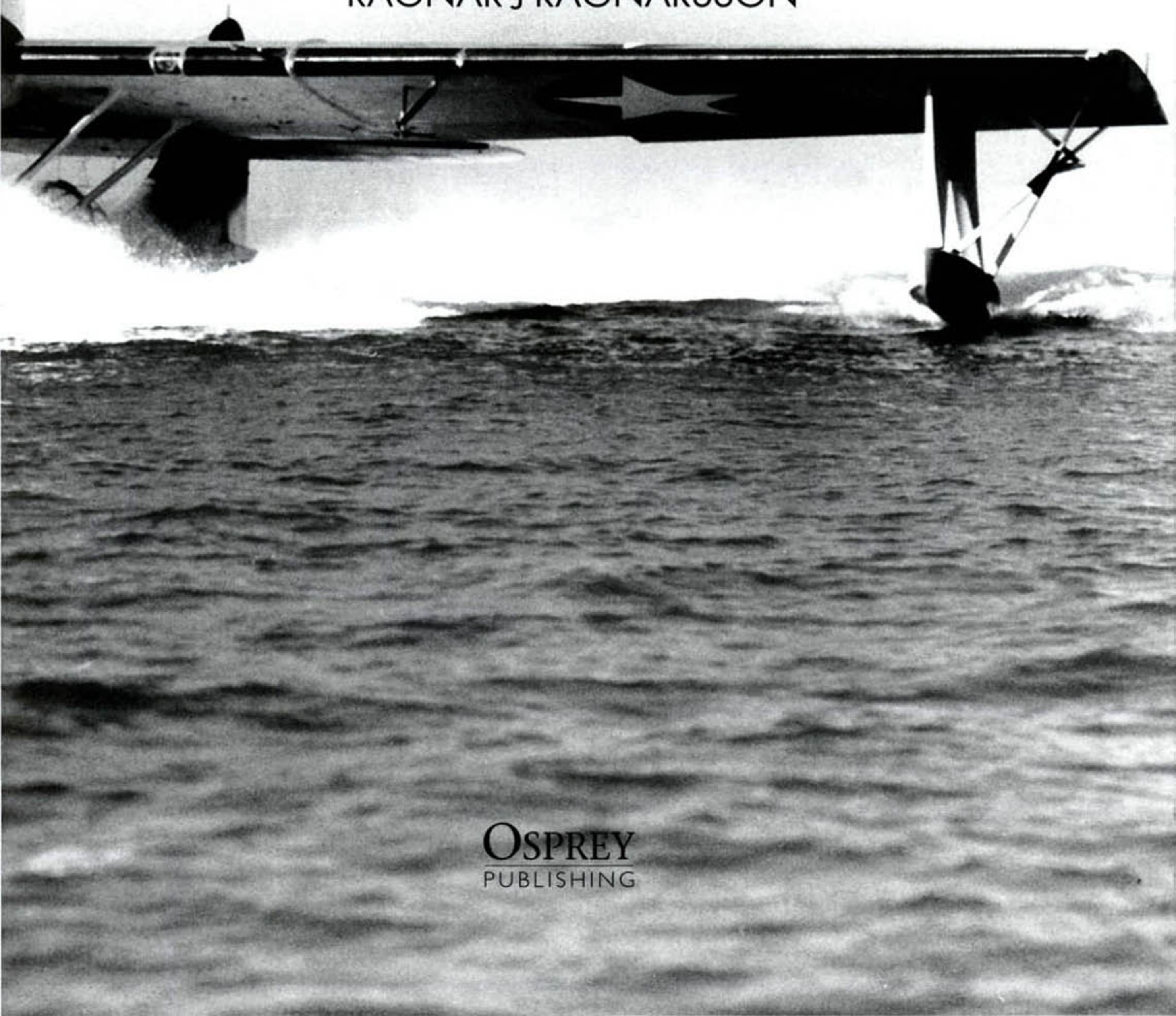
US NAVY PBY CATALINA UNITS OF THE ATLANTIC WAR

SERIES EDITOR: TONY HOLMES

OSPREY COMBAT AIRCRAFT • 65

US NAVY PBY CATALINA UNITS OF THE ATLANTIC WAR

RAGNAR J RAGNARSSON



OSPREY
PUBLISHING

Front cover

On 5 November 1942, three PBY-5As from VP-84 were conducting anti-submarine sweeps 100 miles off Iceland's north coast when Lt Robert C Millard, flying BuNo 7273/8, sighted a fully surfaced U-boat four miles away. Without hesitation Millard flung the PBY into a 180-mph diving turn and attacked the submarine head-on, dropping two 325-lb Mk 17 and two 650-lb Mk 29 depth charges in salvo from a height of 125 ft as he swept over the U-boat from bow to stern. The lookouts aboard U-408 were clearly taken by surprise, as the crew of the PBY spotted eight or nine men in the conning tower as the flying-boat passed overhead.

The depth charges straddled the U-boat, hitting the water about 40 ft immediately aft of the conning tower. When they exploded, the sea erupted in a huge tower of water that engulfed the U-boat and washed the men on the bridge overboard. Once the explosion had subsided, seven sailors were seen struggling amidst the wreckage in a large patch of oil that marked the spot where the U-boat had sunk.

Millard circled the scene for almost an hour before returning to base, but for reasons not explained in the crew's report, no attempt was made to drop a life raft or emergency rations to the men in the water. By the time the PBY left the scene of the attack, the few surviving submariners had all perished in the bitterly cold sea.

Bob Millard's outstanding attack was an example of unusual accuracy. Up until this particular action, the usual practice amongst PBY crews was to attack submarines across their length at an angle, dropping the depth charges in a stick. This allowed the pilot a larger degree of aiming error, but resulted in at least half the number of depth charges falling beyond lethal range of the target. However, Millard had chosen to attack U-408 along its length, releasing his depth charges in salvo to maximise their destructive power. It was a method that demanded exceptional precision, and allowed virtually no margin of error.

The four depth charges were seen to fall on and to port of the U-boat's stern, and any one of these would probably have ruptured the boat's pressure hull. Had Lt Millard stood on the U-boat's deck and rolled his depth charges over its side, he could hardly have placed them more accurately! It was indeed a superb attack for which Bob Millard deservedly received the Distinguished Flying Cross and his crew the Air Medal (*Cover artwork by Mark Postlethwaite*)

First published in Great Britain in 2006 by Osprey Publishing
Midland House, West Way, Botley, Oxford, OX2 0PH
443 Park Avenue South, New York, NY, 10016, USA
© 2006 Osprey Publishing Limited

All rights reserved. Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright, Design and Patents Act 1988, no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrical, chemical, mechanical, optical, photocopying, recording or otherwise without prior written permission. All enquiries should be addressed to the publisher.

ISBN 10: 1-84176-910-X
ISBN 13: 978-1-84176-910-3

Edited by Tony Holmes
Page design by Tony & Stuart Truscott
Cover Artwork by Mark Postlethwaite
Aircraft Profiles Jim Laurier
Scale Drawings by Mark Styling
Index by Alan Thatcher
Originated by PPS Grasmere, Leeds, Uk
Printed in China through Bookbuilders

06 07 08 09 10 10 9 8 7 6 5 4 3 2 1

For a catalogue of all books published by Osprey please contact:
NORTH AMERICA
Osprey Direct, C/o Random House Distribution Center,
400 Hahn Road, Westminster, MD 21157
E-mail:info@ospreydirect.com

ALL OTHER REGIONS
Osprey Direct UK, P.O. Box 140 Wellingborough, Northants, NN8 2FA, UK
E-mail: info@ospreydirect.co.uk
www.ospreypublishing.com

ACKNOWLEDGEMENTS

The creation of this book would not have been possible without the generous help of the following individuals to whom I am indebted – Mark Aldrich (USA), Jean-Pierre Dubois (France), Romulo P Figueiredo, Col *Força Aérea Brasileira* (Ret.), C 'Herb' Gilliland, Capt USNR (Ret.), Wynnum B Graham (Australia), Jean-Michel Guhl (France), Jerry Mason, Capt USN (Ret.), Axel Niestlé (Germany), Günther Ott (Germany), James C Sawruk (USA) and last, but by no means least, Eric Zimmerman (Canada), who took the time to read over the manuscript and offer numerous suggestions for its improvement. I also wish to thank those who granted me permission to use their photographs, in particular Mrs Audrey S Balchen for allowing me to use imagery taken by her late husband, Col Bernt Balchen.

Unfortunately, lack of space prohibits me naming the dozens of US Navy PBY pilots and aircrew who, over the years, have shared with me their recollections of flying in the PBY. Many have since 'folded their wings', and it would not be fair to name only a select few and not all.

CONTENTS

CHAPTER ONE

DEVELOPMENT 6

CHAPTER TWO

PRELUDE TO WAR 14

CHAPTER THREE

WESTERN ATLANTIC 19

CHAPTER FOUR

NORTH ATLANTIC 27

CHAPTER FIVE

SOUTH ATLANTIC 54

CHAPTER SIX

EASTERN ATLANTIC 62

CHAPTER SEVEN

SEARCH AND RESCUE 74

APPENDICES 84

COLOUR PLATES COMMENTARY 91

INDEX 96

DEVELOPMENT

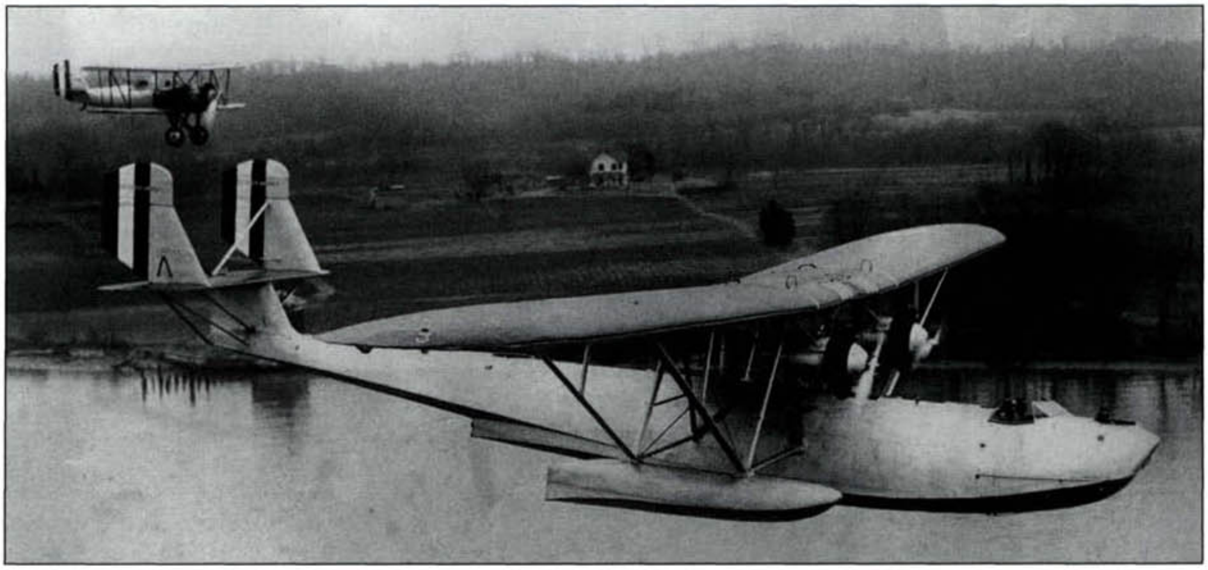
Several accounts have been published on US naval patrol aircraft in World War 2, but none do justice to the role played by the Navy's patrol squadrons in what proved to be their longest and most bitterly fought campaign of the war – the Battle of the Atlantic. From the Arctic to the South Atlantic, anti-submarine aircraft patrolled both sides of the Atlantic Ocean alongside their Allied counterparts, keeping open the supply lines from the USA to Great Britain and the Mediterranean.

There can be no question that Consolidated's PBY Catalina is the most successful flying-boat ever designed. Built in greater numbers than any other seaplane in history, it served with the maritime air forces of all principal Allied nations throughout World War 2, as well as all four branches of the US military. Except for a few Martin PBM Mariners, the PBY was the only long-range patrol bomber in the US Navy's inventory when the USA entered World War 2 in December 1941.

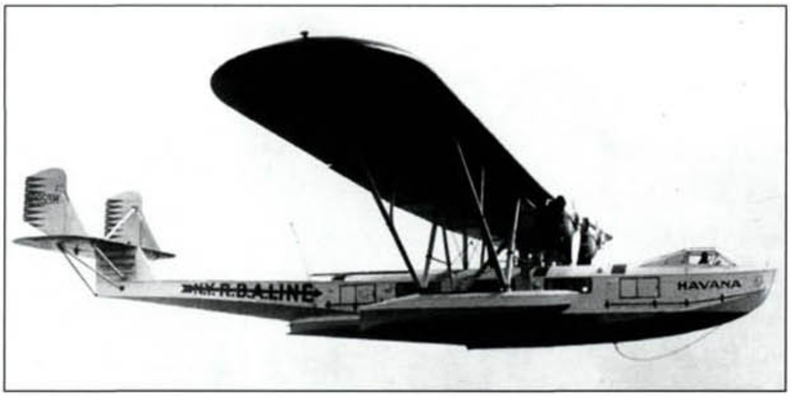
Despite having been declared obsolescent by that time the Japanese launched their surprise attack on the Pacific fleet in Pearl Harbor, the PBY would remain in production and serve in significant numbers until war's end, and, in some instances well beyond. The PBY's total contribution to victory over Germany can only be surmised, as the number of ships and lives saved by their mere presence over merchant convoys can never be known. However, the destruction of 20 submarines can be directly attributed to the PBY, with numerous others damaged.

ANCESTORS

The PBY traces its origin to 1927, when the Consolidated Aircraft Corporation (established four years earlier by Maj Reuben Hollis Fleet) of Buffalo, New York, decided to participate in a contest to build a prototype multi-engined long-range flying-boat for the US Navy. Based on designs developed by naval engineers, it was the company's first foray



Consolidated XPY-1 BuNo A-8011 is seen here about to alight on the Potomac River at NAS Anacostia in January 1929. This photograph may very well have been taken during the aircraft's maiden flight on 10 January 1929. The flying-boat is being escorted by a Vought O2U, which is acting as a chase-plane (*San Diego Aerospace Museum Collection*)



Commercial Model 16-1 Commodore NC659M heads for New York City on 17 December 1929. The third Commodore built, this aircraft was delivered to NYRBA (New York, Rio Buenos Aires Line) on 26 November 1929. NC659M was transferred to NYRBA's successor Pan American Airways on 15 September 1930, before finally joining the latter's subsidiary operator Panair do Brasil on 5 August 1935 and being re-registered as PP-PAO. The veteran flying-boat had its registration cancelled in May 1937 (*San Diego Aerospace Museum Collection*)

into seaplane construction – a field duly dominated by Consolidated for more than a decade.

Christened the Admiral by Maj Fleet and designated the XPY-1 by the Navy, the aeroplane first took to the air on 10 January 1929. Although the prototype successfully met all of its design requirements during the flight test programme that followed, Consolidated was not to have the good fortune of 'parenting its child from infancy'. Instead, a contract was awarded to the Glenn L Martin Company, which had underbid Consolidated by a significant margin for the construction of a batch of nine aeroplanes. No PY-1 was ever built because of this, Martin instead constructing P3M-1/2s, both of which followed Consolidated's specification.

By good foresight, the XPY-1 had been designed so that it could be converted into a passenger-carrying aircraft in the hope that the creation of the latter might stimulate the development of long distance airline routes. Consolidated's gifted aircraft engineer, and father of the PBY, Isaac Macklin 'Mac' Laddon, now set about the task of converting the XPY-1 design into a commercial flying-boat. The end result was the Commodore, 14 of which were delivered to the New York, Rio Buenos Aires Line, and its successor, Pan American Airways. These aircraft duly pioneered a luxury airline service to the Caribbean and South America, which they serviced for many years.

Determined not to let Martin deprive them of what they saw to be their own design, and market, 'Mac' Laddon's engineering team undertook a major revision of the XPY-1 to meet new Navy requirements. The end result of their efforts was the P2Y-1 Ranger. So impressed was the Navy with Consolidated's new design that 23 aeroplanes were ordered off the drawing board months before the prototype had flown.

As soon as the P2Y-1 entered squadron service, its long range was demonstrated through a series of spectacular non-stop flights to both the Panama Canal Zone and Hawaii. Further refinement of the design resulted in production of the P2Y-2/3, and these aircraft remained in service until 1941, when they were relegated to training squadrons.

A P2Y-3 of VP-7F flies over San Diego County on 4 January 1936 (*San Diego Aerospace Museum Collection*)

FIRST PBY

The success of the P2Y led to the design of Consolidated's Model 28, which was a radical new flying-boat that would be designated the PBY (P for Patrol, B for Bomber and Y for Consolidated, as the letter C had long since been assigned to pioneer aircraft manufacturer Curtiss) in frontline service. Initially, however, the aircraft was known as the XP3Y-1 in prototype form, and it was powered by two Pratt & Whitney R-1830-58 Twin Wasp, double-row, 14-cylinder engines rated at 825 hp for take-off.

Particular attention was given to reducing drag, even to the point of having the outboard wing floats retracting into the wings to form its wingtips. The aeroplane was constructed entirely of metal, bar the control surfaces and the wing aft of the rear spar, which were covered with fabric. The wing centre section embodied integral fuel tanks, which was a great innovation at the time, as well as a considerable weight saver. A unique feature of the design was the mounting of the parasol wing on a single pylon over the hull, with only a pair of bracing struts on each side. This arrangement did away with the multitude of wing struts that had been a feature of its predecessors, thus making the XP3Y-1 one of the cleanest flying-boats yet designed.

XPBY-1 BuNo 9459 flies over San Diego's Lindbergh Field after having set a new world non-stop distance record for seaplanes. The naval air station at North Island is visible across the bay. BuNo 9459 entered service with VP-11F in July 1936 and was stricken on 28 June 1944 (*USN*)

First flown on 21 March 1935, the XP3Y-1 was in competition with the Douglas XP3D-1 for the US Navy contract. Although the XP3Y-1 exceeded contract performance specifications, the two designs turned out to be so evenly matched that the Navy ended up making its final selection based on the price of the individual machines. Consolidated successfully underbid Douglas, and in June 1935 it received an order for 60 P3Y-1s – the largest contract for flying-boats placed since World War 1.

Capable of carrying bombs and torpedoes under its wings, the P3Y-1's designation was quickly changed to PBY-1, thus better reflecting its role as a bomber. By this time the design had undergone several changes, including the adoption of an extended hull and the fitment of a modified rudder to improve directional stability. More powerful 900 hp engines had also been introduced, and these offset the weight growth associated with the inclusion of a rotatable turret, housing a single 0.30-cal machine gun, in the bow. The XP3Y-1 was modified to incorporate these latest changes and was redesignated the XPBY-1.

The first production aircraft was delivered to the Navy from Consolidated's new plant at Lindbergh Field, in San Diego, on 5 October 1936, and the first patrol squadron to receive examples of the new flying-boat was VP-6F, home-based at Pearl Harbor, in Hawaii. PBY-1s remained in frontline service until November 1941, when the last

PBY-1s of VP-12 warm up on the flightline at North Island on 10 January 1939, prior to making a 3000-mile flight to the Panama Canal Zone to take part in Caribbean fleet manoeuvres. Instead of then returning to San Diego, VP-12 transferred to the Atlantic Fleet's PatWing 5 and was redesignated VP-51 on 1 July 1939 (*Mark Aldrich Collection*)

PBY-2 BuNo 0474/31-P-9 of VP-31, home-based at NAS Coco Solo, prepares to alight alongside the Grace Line's SS *Santa Clara* off the Ecuadorian coast in order to effect the evacuation of an injured seaman and fly him to hospital in nearby Guayaquil, Ecuador. This aeroplane is the subject of the colour plate planform 28 (*USNI*)

remaining airframes were transferred to training squadrons.

SUBSEQUENT MODELS

Even before the first PBY-1 was delivered, the Navy had ordered 50 slightly modified PBY-2s. This variant featured a one-piece solid horizontal stabiliser, with inset elevators replacing the full-span elevators of the PBY-1. The latter necessitated a cut-out in the rudder to accommodate the stabiliser, instead of the cut-out on the PBY-1's elevator to facilitate free movement of the rudder. Reinforcement ice-shield strips were also added to the hull parallel to the propeller arc to protect it from damage caused by chunks of ice being thrown off the blades.

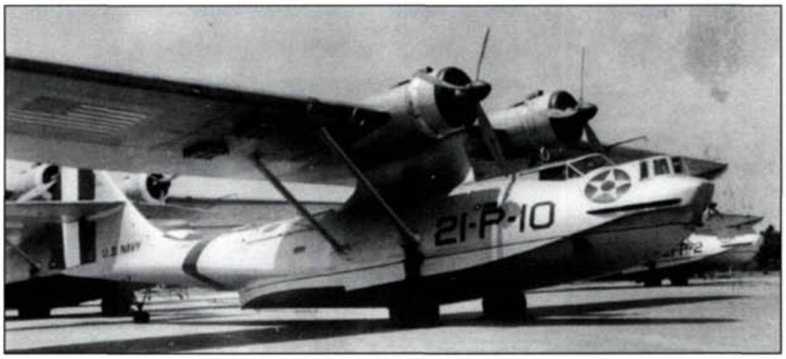
The first unit to receive PBY-2s was VP-11F, based at Naval Air Station North Island, in San Diego – it had received its full complement of 12 aeroplanes by October 1937. As with the PBY-1, the PBY-2 remained in service until November 1941, by which time all bar four had been lost. The survivors were then transferred to training units.

The follow-on PBY-3 was essentially similar to the PBY-2 except for the fitment of more powerful engines, some minor structural changes and added equipment. Two new 1000 hp Pratt & Whitney Twin Wasp engines were installed, each boasting a down-draft carburettor which meant that the powerplant's air intakes had to be moved from beneath the engine nacelle to the top. A total of 66 PBY-3s were built, and the first 12 were delivered to North Island-based VP-7 between November 1937 and March 1938. These dozen flying-boats, plus two more, were the only PBYs to be equipped with Curtiss Electric propellers.

When the USA entered the war in December 1941, VP-21 and VP-22 in Pearl Harbor and VP-32 in Coco Solo, in the Panama Canal Zone, were still flying PBY-3s. Both units soon re-equipped with PBY-5s, but VP-32 would not part with its last PBY-3 until March 1943, when the squadron had received its full complement of Martin PBM-3C Mariners.

The PBY-3 was followed by 34 PBY-4s, powered by 1050 hp Pratt & Whitney R-1830-72 Twin Wasp engines. Externally, this variant differed from its predecessors by having propeller spinners, although photographic evidence shows these were not always fitted to earlier models. Three late-production PBY-4s were also equipped with Perplex

PBY-3 BuNo 0862/9-P-9 of VP-9 sits moored to a buoy in Lake Washington, near Seattle (*San Diego Aerospace Museum Collection*)



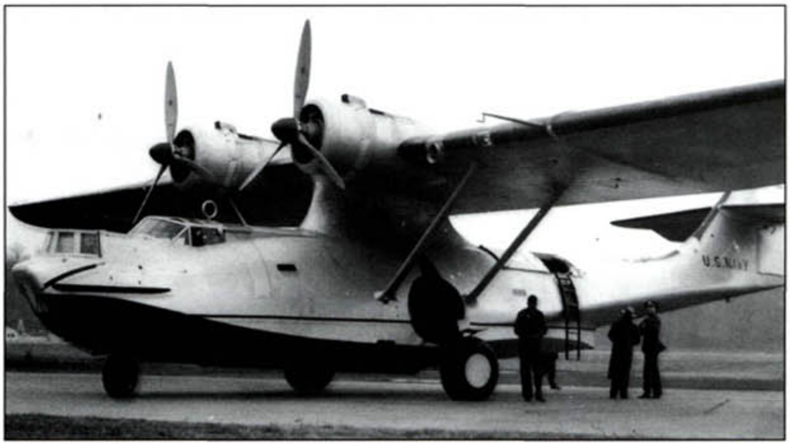
This photograph of VP-21's PBY-4, BuNo 1216 shows off all the markings unique to the unit during its Neutrality Patrol phase. In addition to the national insignia carried on the bow in a similar style to that worn by its stateside brethren, the Navy felt it prudent to also paint an American flag beneath each wing and across the top of the rear hull. The tail markings consisted of single, vertical, red, white and blue stripes, with blue forward – another concession to making sure that no one was in doubt as to the nationality of this aeroplane. The cowl rings, fuselage band and wing chevron were painted black. This photograph was taken in the Philippines, presumably at Cavite (*USNI*)

blister canopies for their twin waist gun positions, these replacing the sliding hatches of earlier models. The blisters would be a distinguishing feature of all subsequent variants.

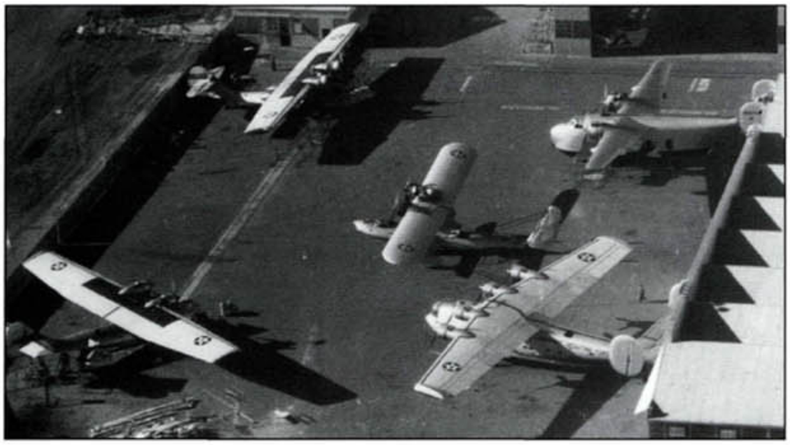
The last PBY-4 built was converted into amphibious configuration, having a retractable tricycle landing gear installed in its hull. The Navy designated the aircraft the XPBY-5A (A for Amphibian), which was something of a misnomer, however, as it was identical to the PBY-4 except for the landing gear.

Apart from two PBY-4s retained as development aircraft for the PBY-5/5A, the rest were delivered to Pearl Harbor-based VP-1 and VP-18 of Patrol Wing (PatWing) 2. Following redesignations to VP-21 and VP-26, respectively, both units transferred to the Philippines, where they formed the nucleus of the Asiatic Fleet's PatWing 10 as VP-101 and VP-102. By March 1942 most of these aircraft had been shot down or destroyed in Japanese air raids, and only one PBY-4 would eventually find its way back to the United States.

As well as the 210 PBY-1/4s built for the US Navy, Consolidated also constructed seven flying-boats for non-Navy customers. Three were sold to domestic civilian operators and four exported to foreign governments.



The last PBY-4 built, BuNo 1245 was converted into an amphibian through the introduction of a retractable undercarriage. Redesignated the XPBY-5A, it was the first of 1428 PBY amphibians to be constructed. The aircraft is seen here upon its arrival at NAS Anacostia on 16 December 1939 (*USNI*)



A late 1939 aerial view of the flight test compound at Consolidated's San Diego plant. Visible, clockwise from bottom left, is XPBY-5A BuNo 1245, a PBY-4 (almost certainly BuNo 1241) in the markings of VP-13 and fitted with the waist blisters made standard on the PBY-5, Model 31 Corregidor NX21731, a P2Y-2 and XPB2Y-1 BuNo 0453, which was assigned to Adm A B Cook, Commander Aircraft Scouting Force, as his staff transport (*San Diego Aerospace Museum Collection*)

Three of the latter were supplied to the USSR as part of a contract signed in 1937 which also gave the Soviets permission to produce the type under licence. A trio of Model 28-2s (similar to the PBY-1) were delivered by Consolidated as freight and mail carriers, and the communist machines were designated GSTs (*Gydro Samoliot Transportnyj* – Cargo Hydroplanes) by the Russians. Built at Beriev's plant in Taganrog, on the Azov Sea coast, a total of 24 GSTs (and its MP-7 civil counterpart) were delivered. The other export sale was a single Model 28-5 (modified PBY-4) supplied to Britain in 1939 for evaluation by the Royal Air Force (RAF) – several hundred more would subsequently follow.

LIFE EXTENSION

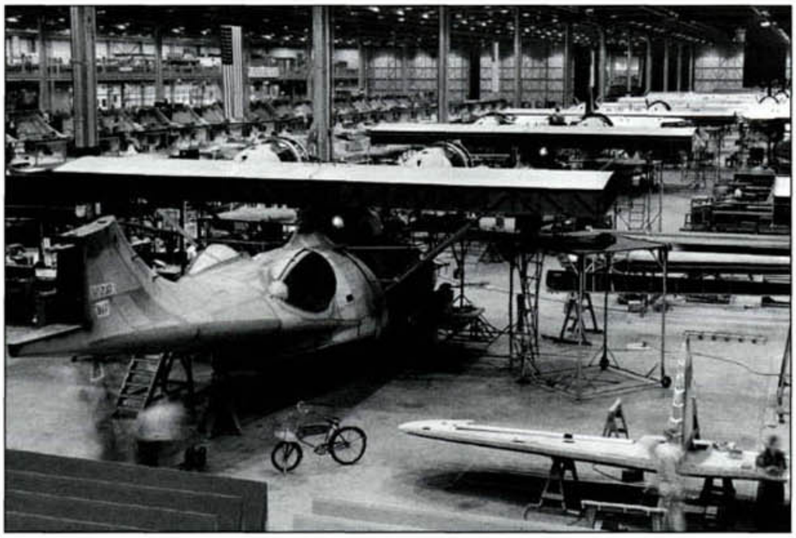
By mid-summer 1939 Consolidated had delivered the last PBY-4, and its order book stood empty. The PBY's days appeared to be numbered, and the US Navy had already placed an initial order for its designated successor, Martin's PBM Mariner. That was all to change, however, with the outbreak of war in Europe. Being the only tried and tested long-range flying-boat design available for immediate production at an affordable price, the PBY was suddenly back in demand. Great Britain, Canada, Australia and The Netherlands East Indies all ordered the type in quantity, and the US Navy placed an order for an additional 200 flying-boats to meet the requirements of its Neutrality Patrol.

Consolidated responded by offering the improved PBY-5, with squared-off vertical tail surfaces, blisters in place of sliding hatches in the waist gun positions and new 1200 hp R-1830-82 engines. By the time the last PBY rolled out of Consolidated Vultee's New Orleans plant in January 1945, 2000+ PBYs had been built by Consolidated alone.

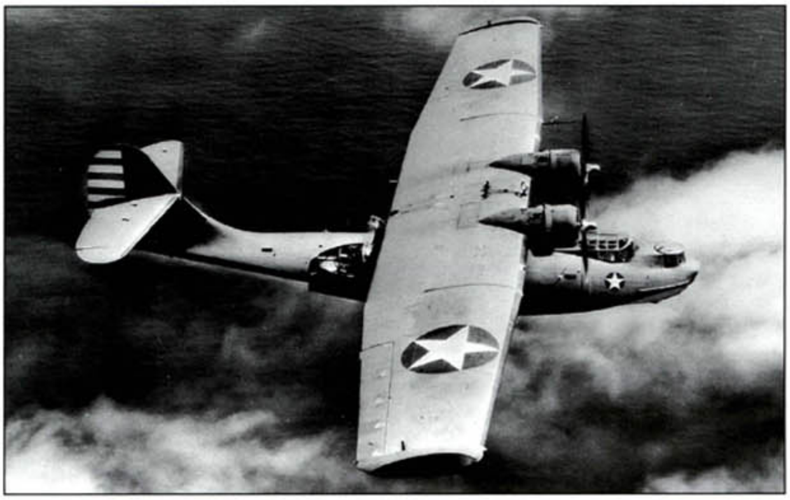
The British named the PBY the Catalina after Catalina Island off the coast from Long Beach, California, and this name was eventually adopted by all other users of the aircraft except for the Canadians, who christened it the Canso. And although the US Navy officially adopted the Catalina name, it continued to be known as either the PBY, the 'P-boat' or the 'Yoke-boat' to the crews that manned and maintained it.

As the war progressed and the United States entered the conflict, demand for the PBY increased as never before. In order to keep up with demand, Consolidated contracted several companies to build versions of the aircraft under licence. Amongst them was the Naval Aircraft Factory (NAF) in Philadelphia, which built 156 improved PBN-1 Nomads. No fewer than 138 of these were delivered to the Soviet Union, with the remaining 18 being supplied to the US Navy, although none of the latter aircraft saw combat duty.

Boeing of Canada, based in Vancouver, British Columbia, built 362 as the Canso A (Amphibian) and PB2B-1/2, while Canadian



Consolidated's PBY assembly line in San Diego in 1942. The aeroplane in the foreground is a lend-lease Catalina IB (PBY-5B) FP230, destined for the RAF. This particular flying-boat made its transatlantic crossing from Bermuda to Greenock, in Scotland, on 6/7 October 1942. After being modified for service with the RAF, it was initially issued to No 202 Sqn in Gibraltar, before being passed on to No 191 Sqn in India (*San Diego Aerospace Museum Collection*)



This photograph of a PBY-5A amphibian in flight in early 1942 shows to good advantage the aircraft's large wing span of 104 ft and 1400 sq ft wing area. Although not visible, the national insignia on the wings have red centres. The red and white rudder stripes were short-lived, lasting from December 1941 through to May 1942, when the red centre to the national insignia was also cancelled (*NARA 80-G-65161*)

Vickers of St Hubert, Quebec (later Canadair Ltd of Cartierville, Quebec), also built 369 amphibians, 139 of which were supplied to the Royal Canadian Air Force (RCAF) as Canso As and 230 to the US Army Air Force (USAAF) as OA-10As.

The final production version of the Catalina was the PBY-6A, which was an amphibian based on the NAF's PBN-1 Nomad. The PBY-6A featured a sharper bow, a 20-degree taper step amidships, 26 inches added to the height of the vertical stabiliser and rudder, and a radome mounted above the cockpit. The US Navy ordered 900 PBY-6As in 1945, but just 175 had been completed when all contracts were cancelled in the wake of VJ-Day. Of these, 48 were delivered to the Soviet Union and ten to the USAAF as OA-10Bs.

By the time the final PBY-6A rolled off the Consolidated Vultee production line in April 1945, 1877 flying-boats and 1428 amphibians of all variants had been built, as well as an unknown number produced in the USSR. These figures gave the PBY the distinction of being the most widely produced flying-boat in history.

Following their retirement from military service post-war, many surplus PBYs were sold to commercial operators, who used them to carry passengers and freight in parts of the world where suitable airfields did not exist. Large numbers were also converted into fire-bombers, while others became geological survey platforms. Catalinas also went on to equip many of the world's smaller armed forces, with several countries using them until the late 1970s. Today, some 75 Catalinas can still be found in private ownership and in museums around the world, with a number of these veteran machines being maintained in airworthy condition.

PATROL AVIATION DEVELOPMENT

The use of aircraft in combat by the US Navy dates back to World War 1, and the first American airman to receive the congressional Medal of

The last of 2160 PBYs built by Consolidated's San Diego plant, BuNo 46579 reaches the end of the assembly line in March 1944. This particular PBY-5A was diverted to the Royal Australian Air Force as A24-103, reaching Australia in May 1944. After serving with No 3 Operational Training Unit and No 11 Sqn, it was surplused at war's end and sold to Australian National Airways (ANA). After removing the engines for use in its DC-3s, ANA sold the remains to Kingsford Smith Aviation Services and the aircraft was duly broken up at Lake Boga (which had been the wartime home of the RAAF's No 1 Flying Boat Repair Depot), in South Australia (*San Diego Aerospace Museum Collection*)

Altogether, 175 PBY-6As were built by Consolidated Vultee's plant in New Orleans before construction was halted at war's end. Ten were diverted to the USAAF as OA-10Bs and 48 went to the Soviet Union under lend-lease. Except for five PBY-6As operated after the war by Atlantic-based VP-73/VP-AM-4, the bulk of the 117 delivered to the Navy went to patrol squadrons of the Pacific Fleet. This particular aeroplane (BuNo 46642) served with several utility squadrons and was based at NART Glenview, Illinois, before being placed in storage at NAS Litchfield Park, in Arizona, on 14 March 1952 and stricken from the Navy's inventory in August 1956. The amphibian was then sold to the Aircraft Instrument Corporation of Miami, Florida, and allocated the civil registration N9553C, but the latter appears to have never been taken up (*USNI*)

Honor was Ens Charles Hazeltine Hammann of the Naval Detachment at Porto Corsini, in Italy, flying an Italian-built Macchi M.5 seaplane.

Despite its various achievements in World War 1, the development of the naval air arm post-war was a slow affair. Inter-service rivalry between the Army and the Navy, and controversy as to the latter's justification for operating aircraft from land bases, led to the formulation of an official policy by the War Department whereby the Army would control land-based aviation and the Navy sea-based aircraft. Hence, patrol aviation in the Navy during the inter-war years was performed almost exclusively by seaplanes and flying-boats, with the PBY, and its predecessors, playing a leading role.

The organisation of Navy patrol squadrons into wings first appeared in the Naval Aeronautical Organisation for the fiscal year 1935. This provided for three patrol wings, with home bases in San Diego and the US outposts in the Panama Canal Zone and Hawaii. Without any number designations, the wings represented little more than a group of two or more patrol squadrons operating in the same geographic area.

In 1937, number designations were assigned to the wings, with PatWing 1 being based in San Diego, PatWing 2 in Hawaii and PatWing 3 in the Canal Zone. A further two wings were also added, namely PatWing 4 in Seattle, Washington, and PatWing 5 in Norfolk, Virginia. The authorised strength of these five patrol wings was 198 patrol bombers in 18 squadrons, of which more than two-thirds were deployed with the Pacific Fleet.

When war broke out in Europe in September 1939, the predominant strength of the US Navy was deployed in the Pacific, as had been the case for more than a decade. A partial move eastward had begun, however, with the formation of the Atlantic Squadron in January 1939, and this served as the nucleus of the Atlantic Fleet, established in February 1941.

One of the first tasks facing the Navy in September 1939 was the organisation of a Neutrality Patrol, whose object it was to report and track any belligerent forces approaching the shores of the United States or the West Indies. This mission, combined with the threat of a Japanese advance in the Pacific and the need to provide trade protection for convoys carrying lend-lease war material to Great Britain, soon meant that more patrol wings and squadrons needed to be formed.

From its low point of only two patrol squadrons in 1927, the patrol air arm of the Navy had grown to 24 patrol units in eight patrol wings by the time Japan attacked Pearl Harbor on the morning of 7 December 1941. Additional wings were quickly formed as the war progressed, bringing their total number to 18 by VJ-Day. On 1 November1942, patrol wings were redesignated Fleet Air Wings (FAW), reflecting their expanded scope to include squadrons of all aircraft types, rather than just patrol aeroplanes.

PRELUDE TO WAR

Following the outbreak of war in Europe, President Franklin D Roosevelt proclaimed the neutrality of the United States and directed the Navy to organise the Neutrality Patrol to cover the country's sea approaches, as well as those of the West Indies, for the purpose of reporting and tracking any belligerent units in the area.

The Neutrality Patrol consisted mainly of cruisers and destroyers, along with several patrol squadrons and seaplane tenders, that were tasked with policing a 300-mile wide stretch of water from the Canadian border to the Caribbean. With Pan American backing, the Neutrality Patrol zone was soon extended southward to include South America's entire Atlantic seaboard.

It soon became apparent that the most practical way to cover such a vast expanse of ocean was by aircraft, and before long the Neutrality Patrol became predominantly an air patrol. Initially, five patrol squadrons with four seaplane tenders were assigned this duty, with the six PBY-2s of VP-54 that arrived in Narragansett Bay, Rhode Island, on 9 September 1939 being the first to commence these missions on a two aeroplanes twice daily basis. Similar patrols were flown from Norfolk by P2Y-equipped VP-52 and VP-53.

PatWing 3's VP-33 and its PBY-3s transferred on 11 September from the Canal Zone to Guantanamo Bay, in Cuba, for operations in the Caribbean, and two days later VP-51 arrived in San Juan, Puerto Rico, with 12 PBY-1s from Norfolk to patrol the area's southern approaches through the Lesser Antilles. Additionally, the Army Air Corp's 21st Reconnaissance Squadron participated temporarily in the Neutrality Patrol from Key West, in Florida, and PatWing 3's VP-31 and VP-32, based in Coco Solo, patrolled the approaches to the Panama Canal.

The area covered by the Neutrality Patrol expanded considerably when, in September 1940, the 'destroyers-for-bases' deal with Great Britain granted the United States a 99-year lease on bases in the Bahamas, Jamaica, St Lucia, Trinidad, Antigua and British Guyiana in exchange for 50 ex-World War 1 four-stack destroyers. Similar rights were extended

VP-51 was among the first PBY squadrons to be deployed on the Neutrality Patrol following the outbreak of war in Europe, the unit being transferred from Norfolk to San Juan in September 1939. VP-51's PBY-1s are seen here in Puerto Rico the following month. The subject of colour profile 1, BuNo 0130/51-P-6, is parked closest to the camera (*Mark Aldrich Collection*)

PBY-2 '31-P-12' (almost certainly BuNo 0477) of VP-31 is refuelled from a seaplane tender – possibly USS *Lapwing* (AVP-1) – somewhere in the Caribbean (*USNI*)

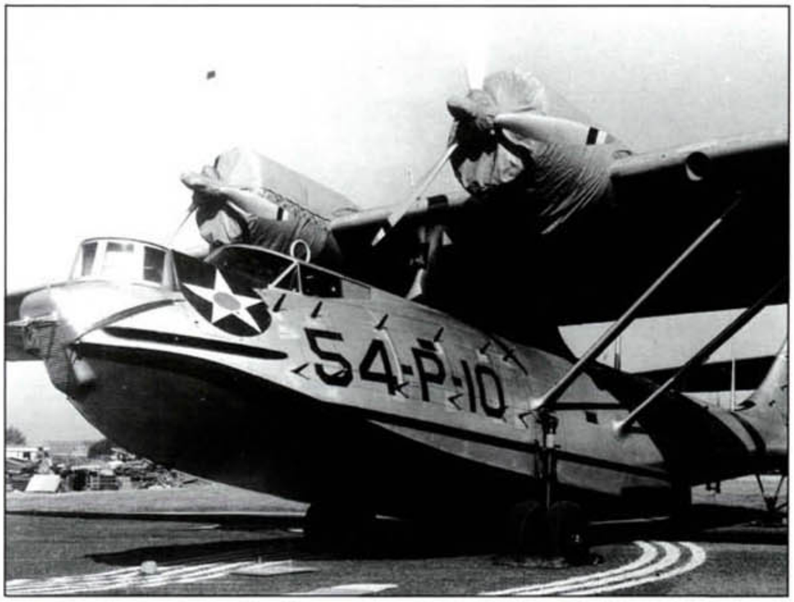
for bases in Bermuda and Newfoundland.

The Lend-Lease Act passed by US Congress in March 1941 ended the fiction of American neutrality in the war, and shortly after this the Navy began escorting transatlantic merchant vessels so as to ensure that supplies destined for Great Britain and the USSR reached their destination.

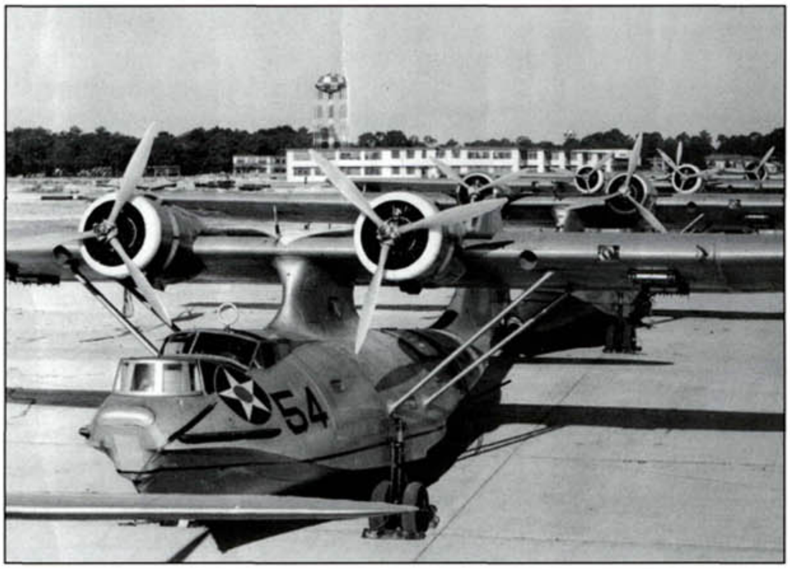
Patrol Force, Atlantic Fleet, was established in March 1941 in order to carry out this task. Abstracted largely from the Neutrality Patrol, it included 27 destroyers and a patrol wing of 42 aeroplanes in four squadrons drawn from PatWing 5, supported by three seaplane tenders, to which a fifth squadron was added the following month. To compensate for the loss of these units, the transfer of two patrol squadrons from the Canal Zone to the Caribbean Patrol was authorised, with PBY-equipped VP-43 and VP-61 being switched from the Pacific Fleet to the newly-formed PatWing 8 in Norfolk. Here, they were redesignated VP-81 and VP-82, respectively.

OCCUPATION OF GREENLAND AND ICELAND

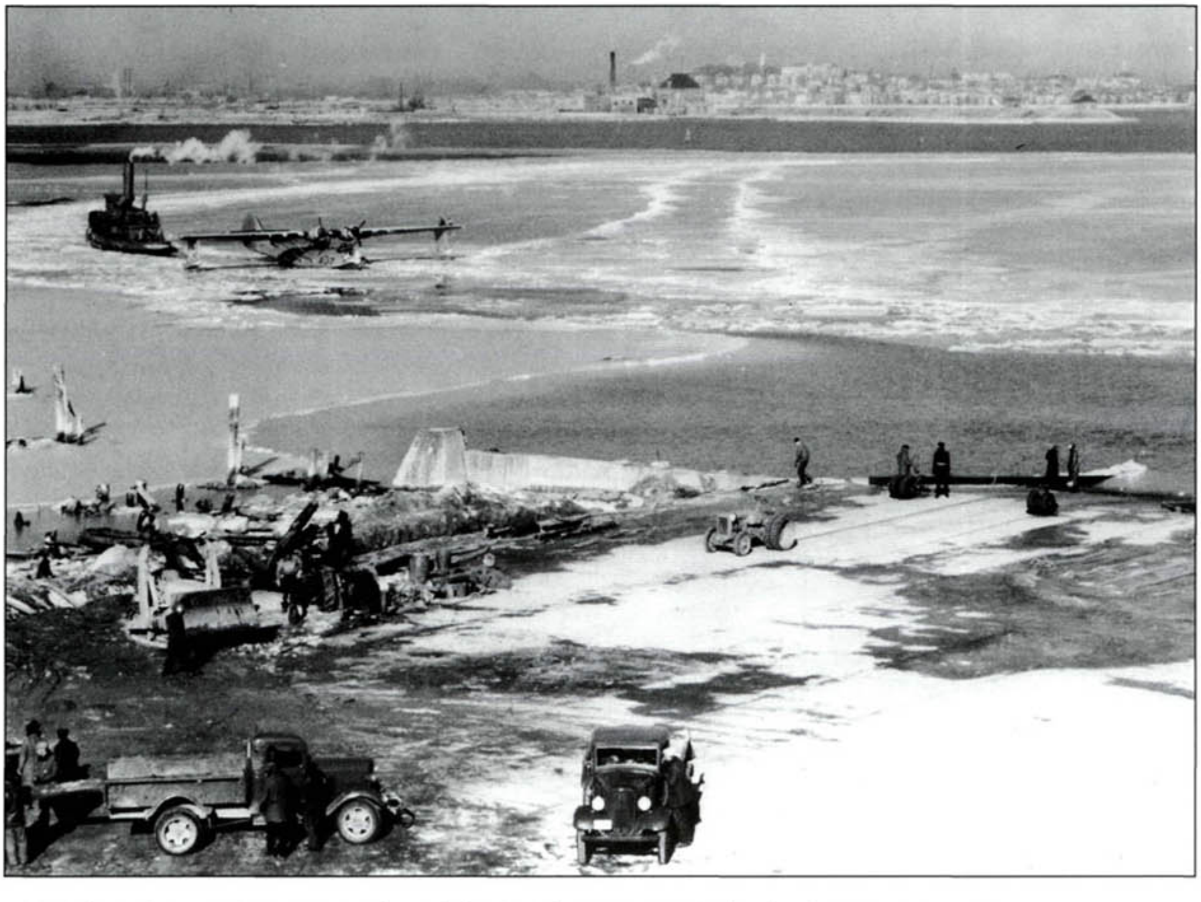
In April 1941 US troops occupied Greenland, thus allowing them to extend the Atlantic security zone claimed for hemispheric defence to longitude 26° West. Included within this zone extension was Iceland and its surrounding waters. The US zone now overlapped the German war zone, which extended south from Greenland along the 38th meridian. Now it was only a matter of time before the opposing forces from these nations clashed.



PBY-2 BuNo 0456/54-P-10 was the first US Navy aeroplane to be equipped with an operational radar. Both the aircraft and its crew were on temporary assignment to NAS Anacostia when this photograph was taken in October 1940, the PBY being used as the platform for a series of flight tests that were carried out by the Naval Research Laboratory at Bellevue, in Washington, D.C. The radar aerials fitted to the hull directly beneath the aircraft's cockpit were part of the STURBA curtain equipment installed in the PBY. Aerials were also carried on the starboard side of the forward hull, as well as atop the rear hull. The aerials on one side of the flying-boat were used for transmitting signals, whilst those on the opposite side received signals from external sources. The significance of the aerial mounted above the bombardier's window on the bow lip remains unclear – perhaps it was used for homing onto ground-based radar emitters? '54-P-10's' rudder and elevators would have been solid gloss black, as would the engine cowl rings (full circle), wing chevron and section leader band on the rear hull (*USNI*)



PBY-1 and PBY-2 trainers site on the line at NAS Jacksonville in August 1941. As in the case of the PBY-2 in the foreground, except for the removal of squadron badges, flying-boat trainers were left in their fleet markings, including the neutrality patrol stars, coloured cowl rings, chevrons, fuselage stripes and tail markings (*USNI*)



This photograph demonstrates well the unsuitability of operating seaplanes in northern latitudes. A PBY-1 of VJ-4 ('4-J-7') is being carefully towed through broken ice flows from the seaplane ramp at NAS Squantum, Massachussets, to open water for take-off (*USNI*)

In July 1941 American troops relieved the British garrison in Iceland, and before long the US Navy commenced escorting merchant convoys crossing the North Atlantic to and from the British Isles.

Initial plans called for the US Navy to provide shipping protection for the entire transatlantic passage, and seaplane bases were already under construction in both Northern Ireland and Scotland when an agreement was reached that the United States would relieve the British garrison in Iceland. Instead, the US Navy took responsibility for covering the

Argentia-based '71P4' (almost certainly BuNo 2323) of VP-71 pays a call to Lake Harbour (now Kimmirut), off Baffin Island, on 20 June 1941, stirring up great curiosity amongst the native population of this Hudson Bay Company Post. This aeroplane was presumably one of two PBYs assigned to a USAAC survey of the Canadian Arctic under the command of President Roosevelt's son, Capt Elliot Roosevelt (*USNI*)

Argentia-Iceland sector of the transatlantic passage. As a result, the Navy's operating area was extended to cover the convoy route between the meridians of Newfoundland and Iceland.

7 DECEMBER 1941

On the 'day that will live in infamy', patrol aviation in the Atlantic Fleet was organised under Commander Patrol Wings US Atlantic Fleet into five patrol wings whose squadrons were stretched over a distance of more than 5000 miles from Iceland to the Panama Canal Zone. On paper, this force consisted of 13 patrol squadrons, with the three newest units yet to be equipped. Of the ten operational squadrons, nine were at full strength, with 93 PBYs being shared between eight units and 12 PBMs in the ninth. Additionally, another squadron was undergoing transition training onto the PBO-1 (Lockheed Hudson), thus becoming the US Navy's first land-based patrol squadron.

PatWing 3, based in Coco Solo, had two squadrons assigned. VP-31, with 12 PBY-5s, was based in San Juan on temporary assignment to the Caribbean Patrol, whilst VP-32, with 12 PBY-3s, flew out of Coco Solo.

PatWing 5, based in Norfolk, had two squadrons assigned. VP-51, with 12 PBY-5s, had one division in Norfolk and another in Bermuda, and VP-52, with 12 PBY-5s, also had a division in Norfolk and another en route from the Caribbean to Natal, in Brazil.

PatWing 7, based in Argentia, Newfoundland, had four units assigned. VP-71, with 12 PBY-5s, and the identically equipped VP-72 were split up between Quonset Point and Argentia. VP-73, with 12 PBY-5s, had detachments in Quonset Point, Argentia and Iceland, while VP-74, with 12 PBM-1s, had flying-boats in Norfolk, Argentia and Iceland.

PatWing 8, based in Norfolk, had four squadrons assigned. VP-81, with nine PBY-5s, was based in Key West, Florida, and had additional duties as the Operational Training Unit, Atlantic Fleet. VP-82, with

PBY-5 '72P12' of VP-72 alights alongside its tender, USS *Albemarle* (AV-5). This aeroplane is possibly BuNo 2347 (or its replacement) that went missing with its seven-man crew on 3 July 1941 while en route from Argentia to Reykjavik to cover the landing of US Marines there. Note a PBY-5 and a PBM-1 on the *Albemarle's* deck (*USNI*)

A memorial service is held at Quonset Point for the seven men that went missing in BuNo 2347/12 en route to Iceland on 3 July 1941. The PBY-5 in the photograph is BuNo 2355, which subsequently became one of the flying-boats that VP-72 flew to Hawaii in December 1941. On 30 October 1942 it was one of three PBY-5s wrecked during an operation to rescue the survivors of a USAAF C-47 that had force-landed on a submerged coral reef off the northwest tip of New Caledonia. It was assigned to VP-51 at the time (*Courtesy of Marlin Crider*)

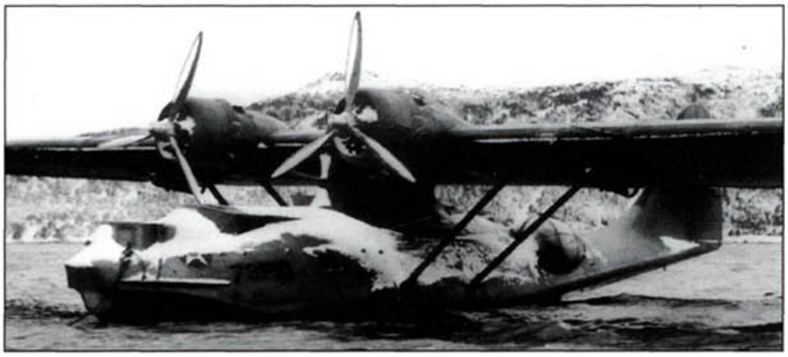
17 PBO-1s, was undergoing transition training in Norfolk. VP-83 and VP-84, although both established, had yet to be equipped.

PatWing 9 was in the process of forming at Quonset Point, but only VP-91 had been established, as VP-92 was still short of key personnel. Neither squadron had any aircraft.

In a frantic effort to reinforce the Pacific Fleet and make up for the heavy losses suffered in the Japanese attacks on Pearl Harbor and Midway, in which 34 PBYs had been destroyed or damaged beyond repair, PatWing 5's VP-51 and PatWing 7's VP-71 and VP-72 were immediately ordered to the West Coast, and thence to Hawaii. Additionally, PatWing 8 was transferred to the West Coast with VP-84, VP-91 and VP-92, but minus their aircraft.

As if this was not costly enough for the Atlantic Fleet, VP-52's first division in Norfolk, and a six-aeroplane division from VP-81 in Key West, were immediately despatched to the Canal Zone to reinforce PatWing 3's meagre resources. The latter wing's high priority mission was to patrol the Pacific approaches to the Panama Canal against a possible Japanese strike.

For all practical intents and purposes, the Eastern Seaboard of the United States had been stripped of its long-range air cover.



VP-73 PBY-5 '73P10' (almost certainly BuNo 2335) sits at a mooring in Argentia, Newfoundland, in late 1941. Due to the severe winter conditions at PatWing 7's air bases in Newfoundland, Greenland and Iceland, flying-boats were replaced by landplanes and amphibians from January 1942. BuNo 2335 was assigned to VP-81 at Key West at this time, but when the squadron transferred to the Pacific in August 1943, it was sent to Corpus Christi to perform training duties. It remained in Texas until stricken from the Navy's inventory on 30 April 1946 (*NARA 80-G-2133*)

WESTERN ATLANTIC

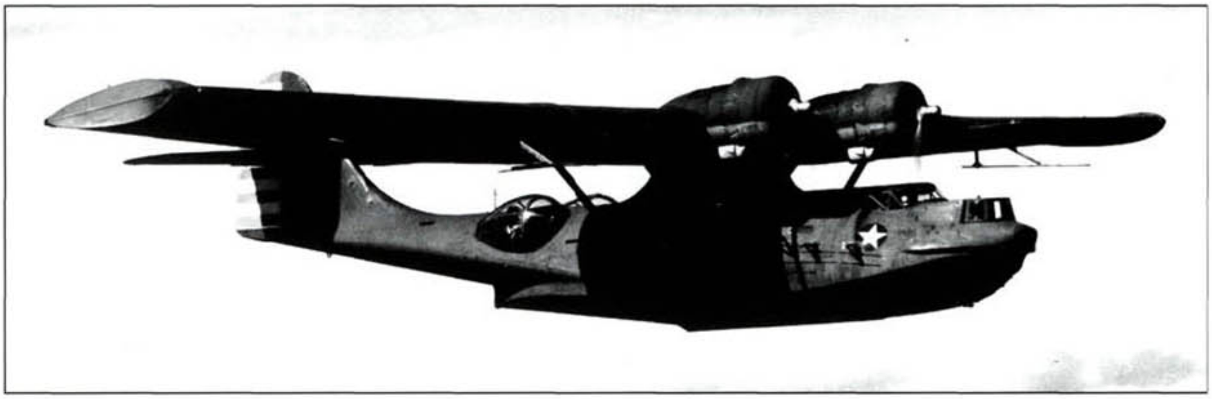
Four days after the Japanese attack on Pearl Harbor, Germany and Italy declared war on the United States. The numerous merchant ships sailing off its east coast, which were still operating in an unprotected peacetime fashion (sailing individually, rather than in convoys), now offered the U-boats a golden opportunity to strike heavy blows on the Allied war effort before they joined the protected transatlantic convoys. This was an opportunity Admiral Karl Dönitz, Commander-in-Chief of the German *Ubootwaffe*, wasted little time in taking advantage of, and on 13 January 1942 the first wave of five long-range Type IX U-boats arrived off the US East Coast to launch Operation *Paukenschlag* (Drumbeat).

Although the appearance of U-boats in American waters scarcely surprised ranking US Navy officers, they were grossly unprepared for the campaign that was about to envelop them. The Navy was responsible for anti-submarine defences, but having been stripped of its resources for other commitments, had neither the destroyers or aircraft with which to parry the U-boat thrust into American coastal waters. Consequently, the PBY saw little action in the U-boat campaign off the US East Coast. Instead, the Navy relied entirely on a motley force of obsolescent USAAC bombers that were manned by crews untrained in maritime air warfare for whatever long-range anti-submarine patrols they could provide.

The first time a PBY dropped its bombs in anger off the Eastern Seaboard was on 30 January 1942 when three PBY-5As of VP-83, which was undergoing shakedown training in Norfolk, were ordered to search for the American tanker SS *Rochester* after it had been shelled and torpedoed by U-106 off Chesapeake Bay. Arriving on the scene just as the tanker sank, Lt William R Ford in BuNo 7255 dropped his bombs on an oil slick that was presumably created by the sinking vessel. The crew aboard U-106, which had crash-dived upon sighting the approaching aircraft, heard the explosions at a safe distance and were not affected.

The next attack to be delivered by a PBY in US waters took place on 28 February when Lt R J Crawley of Key West-based VP-81, flying PBY-5 BuNo 2358/3, sighted what appeared to be the top of a submarine conning tower or periscope in

A newly-delivered PBY-5 from VP-81 is refuelled at NAS Norfolk in late 1941. At the time one half of the squadron was on detachment to the Panama Canal Zone, whilst the other half was based in Key West, where it was busy carrying out anti-submarine patrols and functioning as the Operational Training Unit for the Atlantic Fleet
(*Mark Aldrich collection*)



PBY-5A BuNo 7248 was assigned to VP-73's first division at Quonset Point, and is seen here in flight on 8 March 1942. This aircraft transferred to NAS Anacostia ten days later, where it served out the rest of the war as a testbed for various anti-submarine development programmes. Posted to NAS San Juan in June 1945, it was assigned to the station's operational department until 12 August 1946, when the flying-boat hit a submerged object and sank whilst taxiing for take-off from Fort du France, in Martinique (*USNI*)

Following the entry of the United States into World War 2, aircrew from both VP-83 and VP-84 were assigned temporary duty delivering new PBY-5As to patrol squadrons forming, or reforming, on both the Pacific and Atlantic coasts. Aircrew from VP-84 delivered aeroplanes from San Diego to both Alameda and Seattle, while their brethren from VP-83 ferried PBYs to Norfolk. Note the lack of unit markings on these PBY-5As, seen here passing through an unknown East Coast location in early 1942 (*Mark Aldrich collection*)

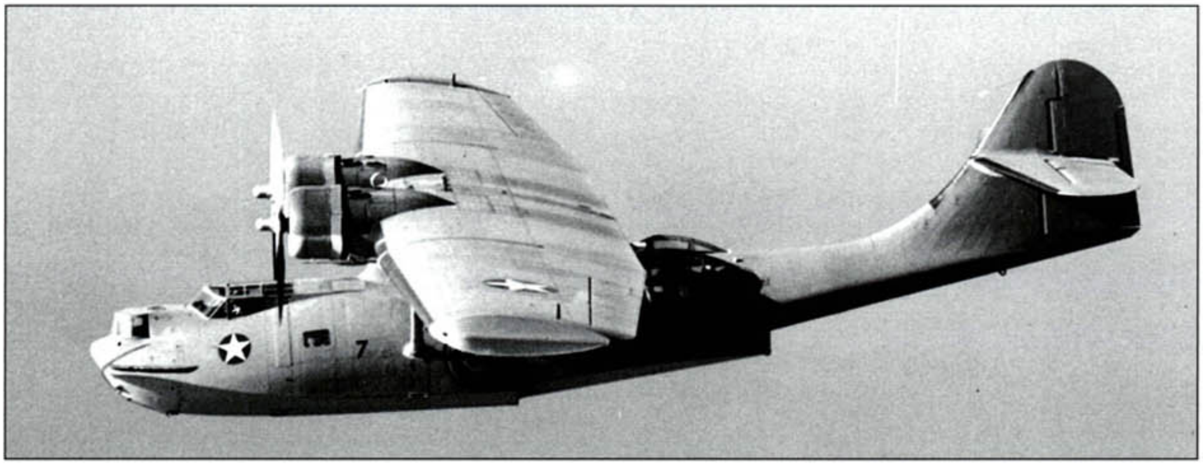
the Straits of Florida. He attacked the object twice, each time dropping two 325-lb depth charges. As no Axis submarine was anywhere near the position of the attack, one must assume that this was not an enemy target.

One hour later, and 1300 miles farther north, the PBY's first confirmed attack on a known submarine was delivered off the US East Coast. Ironically, it was performed against one of its own! VP-73's second division was temporarily based at Quonset Point for training when Lt(jg) Gordon F Smale in PBY-5A BuNo 2466/1 dropped four 325-lb depth charges on USS *Greenling* in the submarine sanctuary off New London, Connecticut. Fortunately, the charges exploded outside lethal range and the *Greenling* limped back to port with only minor damage.

This was not an auspicious beginning for the Atlantic PBY force to be sure, but the USAAC fared no better. Of the 20 attacks delivered by bombers to the end of February 1942, only one has been identified as being against an enemy submarine. Meanwhile, the U-boats had sunk 56 ships totalling 354,000 tons (half of it tanker tonnage) off the US Atlantic Seaboard without suffering a single loss in return.

New PBY patrol squadrons were coming on line as fast as they could be equipped and trained, but the first of these were only made available to the Eastern Sea Frontier Command in April 1942 in the form of VP-83 and VP-84, each equipped with 12 PBY-5A amphibians.

VP-83's East Coast deployment was to be short-lived, however, for upon becoming operational, the squadron's first division of six PBY-5As was transferred to Brazil, where it replaced a division of six PBY-5s from VP-52. VP-83's second division operated temporarily from Norfolk, and later from both Charleston, in South Carolina, and Jacksonville, in Florida, before joining the other half of the squadron in Brazil in June.

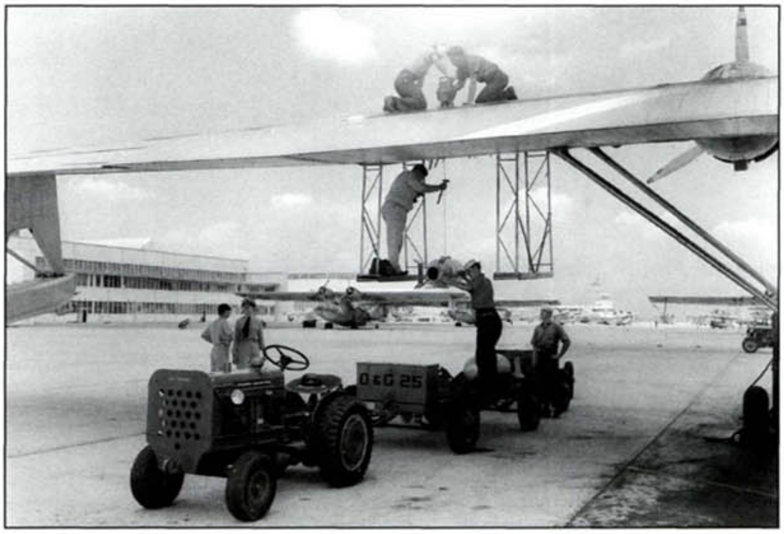


VP-84 arrived in Norfolk from the West Coast in mid-April to become the first PBY unit assigned to the Eastern Sea Frontier Command. The squadron had been struck a heavy blow when two of its PBY-5As (BuNos 7266 and 7269) crashed shortly after taking off from Alameda, in California, on the first stage of their transcontinental flight to Norfolk. Thirteen officers and men, including squadron commanding officer Lt Cdr Loren A Morris, perished in the accident.

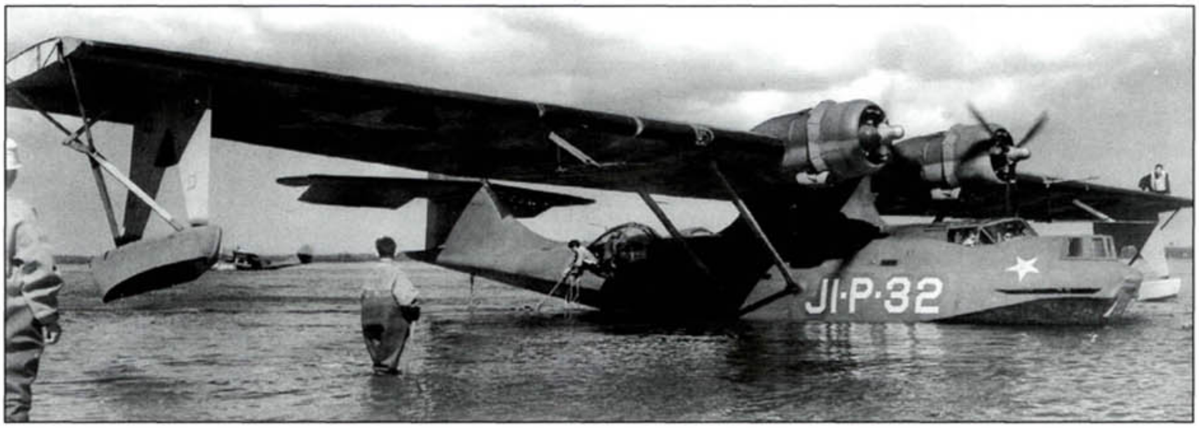
Nevertheless, the unit lost little time getting into action, and before the month was over VP-84 had made its first U-boat attack when, during the evening of 29 April, Lt(jg) Robert A Proctor in BuNo 7277 picked up U-402 on radar 20 miles south of Cape Lookout and dropped four depth charges on it. Although the submarine escaped the attack with only minor damage, the incident was significant for it marked the first occasion that a PBY had located and homed in on an enemy submarine using radar. Ominously for the U-boat force, the attack had also happened at night.

This PBY-5A, seen in flight over Oakland, California, on 15 March 1942, was possibly one of VP-84's aircraft that was undergoing a shake-down at NAS Alameda at the time this photograph was taken. Training over, the unit duly transferred to the East Coast the following month (*USNI*)

VP-31's PBY-5A '31P8' (BuNo unknown) undergoes a preflight check at NAS Norfolk in the autumn of 1942 (*NARA 80-GK-15310*)



So serious was the shortage of aeroplanes capable of carrying out long-range anti-submarine patrols off the US Eastern Seaboard in early 1942 that in May and June a detachment of PBYs from training squadron VN-15 at NAS Jacksonville was assigned to the Eastern Sea Frontier Command and tasked with patrolling Florida's Atlantic coast. Here, Jacksonville PBY-2 trainer '64' is being bombed up prior to flying just such a mission in June 1942. Note that the PBYs in the background are camouflaged, while '64' still wears the pre-war high visibility colours of its former patrol squadron, VP-54 (*NARA 80-G-14332*)



PBY-5 'J1-P-32' (BuNo unknown) was assigned to Jacksonville's Operational Training Unit VPB-2. Note that the national insignia on the hull has been applied inverted! (*NARA 80-G-295450*)

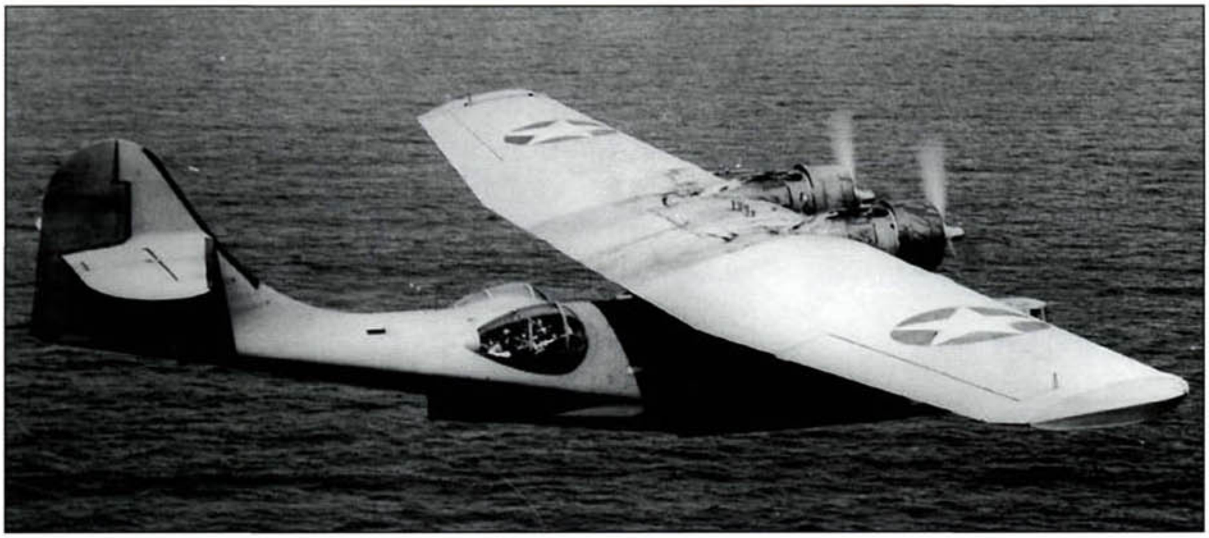
As shipping protection and anti-submarine defences improved within the Eastern Sea Frontier, the U-boats gradually deserted the Eastern Seaboard and moved the bulk of their campaign farther south to the Caribbean and the Gulf of Mexico, where merchant traffic had still to be organised effectively.

CARIBBEAN AND THE GULF OF MEXICO

The second U-boat campaign in the Western Atlantic was launched in the Caribbean in February 1942, with its specific purpose being to disrupt the flow of oil and bauxite from South to North America. Code-named Group *Neuland*, the first wave of five long-range U-boats opened the campaign on 16 February 1942, backed up by five Italian submarines that patrolled the waters east of the Windward Islands chain. Again, the US Navy was woefully unprepared to meet this new threat, and before long losses in the Caribbean approached dangerous levels.

To patrol the 1,580,000 square miles of the Caribbean Sea and the Gulf of Mexico, the three Sea Frontiers in the region – the Caribbean, Gulf and Panama – had under their command 12 PBY-3s and 24 PBY-5s split between four units.

VP-31, with 12 PBY-5s, was spread over several Caribbean islands and tended by USS *Lapwing* (AVP-1). VP-32, with its 12 PBY-3s, and one division of six PBY-5s each from VP-52 and VP-81, was engaged in



A PBY-5A of VP-92 patrols the Caribbean in May 1942, this aircraft presumably being one of five PBY-5As detached by the squadron to St Lucia early that month to keep an eye on the Vichy French island of Martinique (*NARA 80-G-13377*)

patrolling the Pacific approaches to the Panama Canal against a possible Japanese strike, carrying out daily patrols between Salinas, Ecuador, the Galapagos Islands and the Gulf of Fonseca, off Nicaragua. PBYs assigned to training units in Miami, Jacksonville and Pensacola, in Florida, as well as Corpus Christi, in Texas, were available to the Sea Frontiers during emergencies only, and they were not to be used for regular patrols.

Nevertheless, both Pensacola and Corpus Christi-based PBYs flew armed navigational training exercises over the Gulf of Mexico that were designed to provide daily coverage of the entire Gulf. These training flights would, on several occasions, attack U-boats, although they never managed to inflict anything but minor damage on their targets.

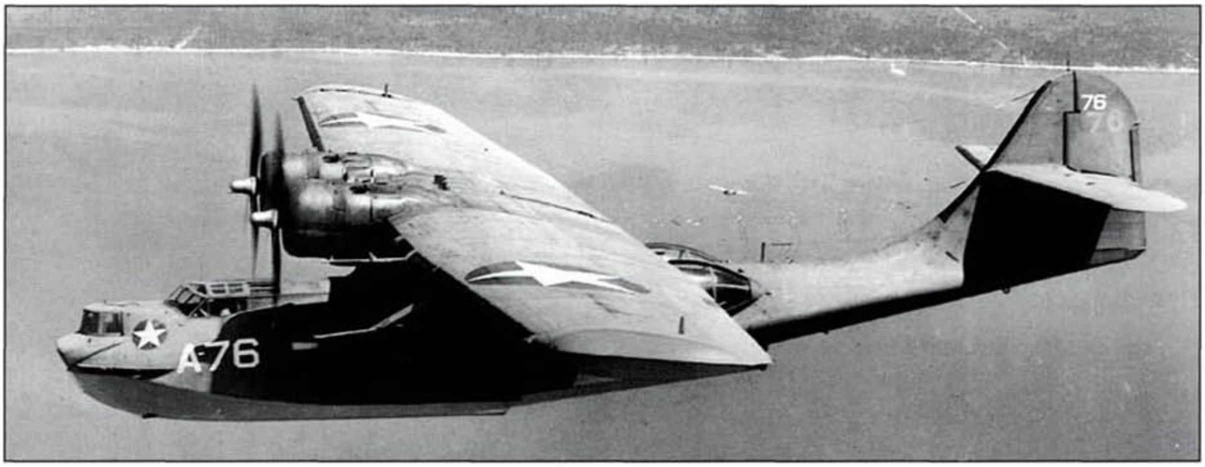
Even before the hard-pressed Eastern Sea Frontier received its first long-range patrol squadron, VP-92 and its 12 PBY-5As was rushed from Alameda, where it had been undergoing shakedown training, to the Caribbean Sea Frontier. Arriving in San Juan on 10 March 1942, the unit quickly sent detachments to both Guantanamo Bay and Antigua to keep an eye on Vichy French naval forces in the islands of Martinique and Guadaloupe. Other PBY patrol squadrons soon followed.

A detachment from Key West-based VP-81 was assigned to the Gulf Sea Frontier in April 1942, followed by the rest of the squadron in September. Additionally, patrol squadrons recently established in Norfolk (VP-33, VP-34 and VP-53) were assigned either to the Caribbean or Panama Sea Frontiers in July and August of that year.

ATTACKS IN THE GULF OF MEXICO

For reasons unknown, air attacks against Axis submarines in the Caribbean-Panama-Gulf theatre are not a matter of clear record. The first of these carried out against legitimate enemy submarine targets in the theatre appear to have been attacks made by unidentified Pensacola-based PBY trainers. The first such attack occurred on 9 May 1942 some 225 miles south of Pensacola itself against U-507, which was one of the two U-boats that had launched the Gulf of Mexico campaign several days earlier. Only minor damage was inflicted on the vessel.

The following day U-507 was again attacked by an unidentified Pensacola-based trainer just 56 miles south-southwest of the naval air



Pensacola-based PBY trainers regularly flew armed navigational exercises over the Mexican Gulf, and on several occasions they attacked enemy submarines. PBY-5 trainer 'A76' (BuNo unknown) of Pensacola's intermediate training squadron VN8D8-A is seen here in standard wartime Blue Grey over Light Grey camouflage (*NARA 80-G-68533*)

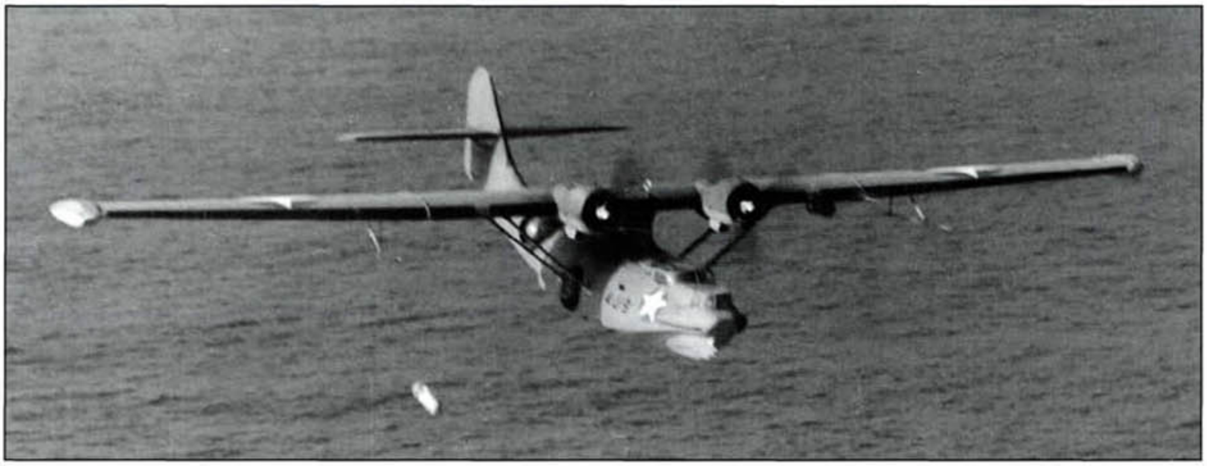
station, and again the U-boat suffered only minor damage. On the 11th, a third unidentified Pensacola-based trainer attacked U-506 200 miles south-southwest of Pensacola, once again inflicting insignificant damage.

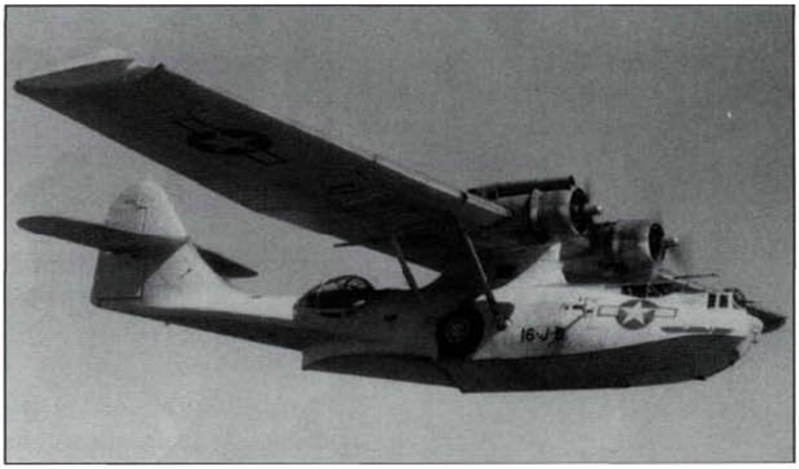
With their supply of torpedoes exhausted, the two U-boats headed home, having sunk 15 ships, totalling 77,000 tons, between them. Included within this tally was the Norwegian freighter *Torny*, which U-507 had despatched on 8 March. All bar two of the ship's 26-man crew had escaped into lifeboats, and they were rescued later in the day by a pair of Pensacola-based PBY trainers. One of the latter was a PBY-2 of training squadron VN8D8-A, flown by instructor William Brewer.

On the evening of 11 July 1942, a U-boat was sighted 60 miles off the northern Panamanian sea port of Almirante. Orders were immediately issued to hunt the vessel to destruction, and shortly after midnight a PBY-3 of VP-32, flown by Lt(jg) David C Pinholster, arrived on the scene. Just before 0400 hrs local time, the crew of the PBY picked up the boat on radar and dropped four 325-lb depth charges on it, reporting a perfect straddle. No evidence of damage was observed following the attack, however, and the hunt was continued with surface vessels as well as USAAF and Navy aircraft, including PBYs from VP-32 and VP-81.

Two days later a submarine believed to be U-153 was located and supposedly sunk by the destroyer USS *Lansdowne* (DD-486) 110 miles west-northwest of Colon, in the Canal Zone. In a letter dated 6 October 1942 to the commanding officer of VP-32, the Commander Panama Sea

Utility squadron PBYs were frequently called upon to carry out anti-submarine patrols, and on 16 July 1942, a flying-boat from VJ-4 dropped depth charges on U-171 in the Windward Passage between Cuba and Haiti. This particular VJ-4 machine is PBY-5A '4-J-9' (BuNo unknown), seen here dropping a practice depth charge (*NARA 80-G-33715*)





Another utility squadron PBY-5A, BuNo 46522/16-J-6 of VJ-16 was photographed operating out of Guantanamo Bay towards the end of the war. Having served post-war as a firebomber in Canada, this particular aeroplane currently resides in the Tillamook Air Museum in Oregon (*Bill Topel, courtesy of Roger D Ferguson*)

Frontier congratulated his crews for assisting in the action, giving the squadron credit, together with other units, for probably sinking the vessel. U-153 was the first U-boat to be sunk in the Caribbean Sea.

The submarine's war diary went down with the vessel, so it is not available for consultation. However, the documentation for another U-boat operating nearby reveals that it was U-505 that was actually attacked by Lt(jg) Pinholster, and that the submarine escaped undamaged. Nevertheless, even if VP-32 was not directly involved in the destruction of U-153, the squadron deserves credit for an 'assist'.

The first PBY to have a direct share in the sinking of a Caribbean U-boat was PBY-5A BuNo 7295/6 of VP-92's Guantanamo Bay detachment, flown by Lt Gordon R Fiss. Providing night escort for the Trinidad-Aruba-Key West convoy TAW 15 on 27/28 August 1942, the aircraft was overflying the northbound convoy as it was just about to enter the Windward Passage between Haiti and Cuba when, shortly before midnight local time, a fully surfaced submarine was sighted in hazy moonlight. The enemy vessel was about one-and-a-half miles off the aircraft's port beam, three miles astern of the convoy.

U-94 (commanded by Oberleutnant Otto Ites) had just manoeuvred into a position within the convoy's screen so as to fire a torpedo at one of the destroyer escorts when a lookout spotted the PBY and the order was given to crash dive. Lt Fiss immediately attacked, releasing four 650-lb Mk 29 depth charges from 50-75 ft. Although these had been set to explode at a depth of 50 ft, they detonated on either side of the conning tower while the U-boat's bow was still awash, blowing the latter into the air and wrecking the diving panes. U-94 was left unable to dive.

The Canadian corvette HMCS *Oakville*, which was escorting the convoy, then headed straight for the disabled U-boat, ramming it and causing it to sink – 19 members of its 45-man crew were lost with the vessel. A veteran Type VII U-boat, U-94 was on its tenth war patrol, having previously sunk 26 ships, totalling 142,000 tons.

As 1942 came to a close, the organisation of shipping into convoys and an increase in the number of anti-submarine air patrols being flown practically brought the Caribbean U-boat campaign to an end. Except for a brief period in the summer of 1943, the enemy would never again pose the same level of threat that it had in 1942, when its submarines sank no fewer than 359 ships, totalling nearly two million tons, in the Caribbean and the Gulf of Mexico. Just seven U-boats had been lost in return.

PBYs REPLACED

In September 1942, Trinidad-based VP-31 was relieved by PBM-equipped VP-74 and transferred to the Eastern Sea Frontier, where it received PBY-5As. Two months later VP-92 was sent to Casablanca, in French Morocco, on the heels of the Allied invasion force in North Africa.

Lt(jg) John E 'Duke' Dryden from Kansas City paints a victory symbol onto his all-white PBY-5 BuNo. 04480/53-P-1 soon after sinking U-156 on 8 March 1943 (*NARA 80-G-41878*)

Lt(jg) Dryden's radioman, ARM2c W F Land, poses for the camera at the radio operator's station aboard his PBY-5 following the sinking of U-156 (*NARA 80-G-73668*)

In December VP-32 commenced replacing its ancient PBY-3s with newer PBM-3s, and the first in a number of new Mariner-equipped squadrons – VP-201 – arrived in-theatre for shakedown training. The Martin-built amphibian was the PBY's designated replacement, but early examples were so plagued with technical problems that in April 1943 the Atlantic Fleet proposed that the PBM squadrons be re-equipped with PBYs to improve the situation.

With so much invested in the PBM programme, Adm Ernest King, Commander-in-Chief of the US Fleet, flatly turned the proposal down, insisting that PBM squadrons be placed in service as soon as possible, and PBY squadrons transferred to the Pacific. His order affected VP-33, VP-34, VP-53 and VP-81 in the Caribbean, as well VP-52 in Bermuda, all of which were to distinguish themselves in the Pacific war.

On 31 July 1943, the last PBY squadron – VP-53 – was detached from the Caribbean, but not before it had sunk a U-boat in the unit's ninth, and last, attack on enemy submarines during its Caribbean deployment.

In the early hours of 8 March 1943, VP-53's Lt(jg) John E 'Duke' Dryden Jnr took off in his all-white PBY-5 BuNo 04480/53-P-1 from the Navy's seaplane base in Cocorite, Trinidad, to carry out an anti-submarine sweep to the east of the Windward Islands chain. Six hours and 460 miles into the flight, a fully surfaced U-boat was sighted at a distance of eight miles.

By skilfully ducking in and out of the broken cloud cover, Lt(jg) Dryden managed to conceal his approach and descend from 4500 ft before breaking into clear skies at 1500 ft just a quarter-of-a-mile from the enemy vessel. Pushing the aeroplane into a 45-degree dive, Dryden dropped out of the sun and manually released four 350-lb Mk 44 Torpex-filled depth charges in salvo from a height of 100 ft above his target. The bombs were observed to hit the water some 10-15 ft to starboard and just aft of the U-boat's conning tower, lifting the submarine out of the water and breaking it in two.

When the cascade of water had subsided, 11 survivors could be seen thrashing about in the water. Rubber life rafts and emergency ration kits were dropped to them, and five submariners climbed aboard one of the rafts. However, despite extensive searches over the next 72 hours, no trace of them was ever found.

The PBY crew had sunk U-156 (commanded by Kapitänleutnant Werner Hartenstein), which had been one of the five *Neuland* U-boats that had launched the Caribbean campaign in February 1942. A Type IXC long-range submarine on its fifth war cruise, and with 20 ships sunk totalling more than 97,000 tons, U-156's tally included the 20,000-ton Allied troopship RMS *Laconia*, which was controversially attacked off the coast of West Africa on 12 September 1942.

By the time the last PBY squadron was detached from the Caribbean, the aircraft had delivered 36 attacks against known U-boats, resulting in two being sunk, 15 damaged and 16 escaping unharmed. VP-32, by now a PBM squadron, would remain in the Caribbean and achieve a splendid record. U-boats with numbers ending in '59' appear to have had a fatal attraction to the squadron, for in the space of only two weeks in July 1943, VP-32 managed to sink no less than three of them – U-159, U-359 and U-759.

Five survivors from U-156 managed to climb into this two-man life raft dropped to them by the PBY's crew. Lt(jg) Dryden was able to stay with them for only 90 minutes on account of his fuel situation, but despite an extensive search which lasted several days, no trace of the survivors was ever found (*NARA 80-G-41381*)

NORTH ATLANTIC

On 1 March 1941, Support Force, Atlantic Fleet was established in order to protect convoys carrying vital lend-lease goods to Great Britain as they crossed the North Atlantic. Abstracted largely from the Neutrality Patrol, this new force consisted of 27 destroyers and 42 patrol aircraft from four squadrons, with the latter supported by the seaplane tenders USS *Albemarle* (AV-5), *Belknap* (AVD-8) and *George E Badger* (AVD-3). Its component patrol squadrons and tenders were placed under the control of Patrol Wing, Support Force, which was established at the same time.

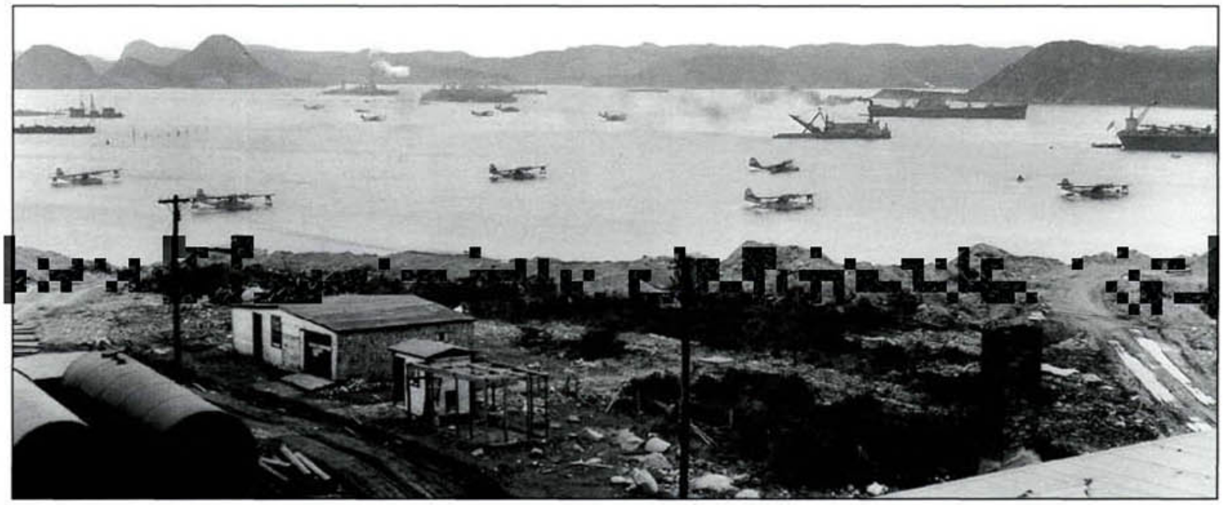
The four patrol squadrons were drawn from PatWing 5, and included VP-51 and VP-52, each with an establishment of 12 PBY-5s, and VP-54 and VP-55, assigned nine PBM-1s apiece. VP-53, with 12 PBY-5s, was added to the wing the following month.

On 1 July 1941 Patrol Wing, Support Force was redesignated PatWing 7, this number having previously been reserved for a patrol wing scheduled to operate in the Caribbean. Its three PBY-5 squadrons, VP-51, 52 and 53, were duly redesignated VP-71, 72 and 73, respectively. Of the wing's two PBM-1 units, VP-55 became VP-74, and its strength increased from nine to twelve PBM-1s, while VP-56 was detached from the wing and transferred to PatWing 5 to become the Atlantic Fleet's Transitional Training Squadron.

On 15 May 1941 the seaplane tender *Albemarle* arrived in Argentia to establish a base for Patrol Wing, Support Force operations, and to prepare for the imminent arrival of VP-52 – this unit would subsequently become the first to fly patrols over the North Atlantic convoy routes. On the 18th, its first three PBY-5s arrived in Argentia from Quonset Point, and air operations immediately commenced from the new base.

Within days of its arrival, VP-52 was called upon to carry out a maximum effort search for the German battleship *Bismarck*, which had been detected in the Denmark Strait heading for the Atlantic. Aeroplanes

A flying-boat haven throughout World War 2, this photograph of Little Placentia Bay (Argentia), in Newfoundland, was possibly taken in August 1941 around the time of the Atlantic Conference between Prime Minister Winston Churchill and President Franklin D Roosevelt. There are nine PBY-5s and two PBM-1s sitting at their moorings, whilst two more PBY-5s can be seen on the stern deck area of the seaplane tender *Albemarle* at the extreme right of the photograph (*NARA 80-G-7446*)



that were in the air were immediately recalled, and within hours 11 of the squadron's 12 PBY-5s were airborne searching an area to the southwest of Greenland. As it turned out, *Bismarck* had turned south after passing through the Denmark Strait and headed for France, probably not coming within 100 miles of the area searched by the PBYs.

The weather conditions turned out to be far worse than had been anticipated for the return flight to Argentia, and none of the aeroplanes managed to return to base directly. Instead, they all landed after extensive flights in various bays off Newfoundland, Labrador, Quebec and other adjoining islands.

Naval Aviation Pilot Robert Weber was a member of BuNo 2391/11's crew that landed in Forteau Bay, in the Strait of Belle Isle, off Labrador, after being airborne for nearly 17 hours. During the night, the bay was hit by a storm that threatened to blow the aeroplane ashore. While hauling in the anchor so that the PBY could be beached, Weber was swept overboard by the heavy seas from where he was standing in the bow. Fortunately, locals ashore saw this happen and were able to get out a boat and rescue him after he had spent 34 minutes in the icy water without a lifevest.

EARLY GREENLAND OPERATIONS

Following the US occupation of Greenland in April 1941, rumours abounded that the Germans were establishing radio and weather reporting stations on Greenland's east coast. Plans were quickly made to despatch the seaplane tender *Belknap*, with a destroyer escort and four PBY-5s of VP-52, to Reykjavik, from where the aeroplanes were to carry out aerial reconnaissance of the Scoresby Sound area of Greenland. Operating from the British seaplane base in Reykjavik, the detachment sent out two aircraft at a time on four reconnaissance missions between 31 May and 6 June without observing any evidence of the rumoured German activity, after which it returned to Argentia on the 8th.

American interest in the occupation of the area was not least to secure the all-important cryolite mine at Ivigtut, on Greenland's west coast. Cryolite, which is an important catalyst in the production of aluminium, is an uncommon mineral found in large quantities only on Greenland's west coast. Germany had stockpiled supplies of cryolite pre-war, and then developed a substitute process for the production of aluminium. If the cryolite mine at Ivigtut had been destroyed or captured by the Axis powers, therefore, not a pound of aluminium could have been produced in North America.

On 6 August 1941, the seaplane tender USS *Lapwing* (AVP-1), on temporary detachment from PatWing 3, arrived off Narsarsuak (now Narsarsuaq) and found a tolerable anchorage in the inner reaches of Tunugdliarfik fjord. A detachment of three PBY-5s from Argentia-based VP-71 began flying out of

In May 1941 four PBY-5s of VP-52 and the seaplane tender *Belknap* were ordered to Reykjavik to carry out reconnaissance of Greenland's east coast in search of a rumoured German presence. Between 26 May and 6 June, two PBYs were sent out at a time on four reconnaissance missions over eastern Greenland, where they found no sign of any German activity. Dwarfed by the inhospitable terrain, '52-P-7' (BuNo unknown) flies along Greenland's east coast (*USNI*)

the bay the next day, but the weather conditions were so precarious that they barely survived the deployment. On 21 August the PBYs flew back to Argentia, and the chastened *Lapwing* steamed out of Tunugdliarfik fjord after them.

The PBYs soon returned to Greenland, however, for on 1 October 1941 four PBY-5s from VP-71 commenced air operations from USS *Gannet* (AVP-8), moored in Narsarsuak's Gannet Bay – the ship had given the bay its name. Finding the Narsarsuak area undesirable for sustained seaplane operations, *Gannet*, along with the tender USS *Goldsborough* (AVD-5), proceeded to Kungnat Bay (Bluie West 2), six-and-a-half miles west of the cryolite mine at Ivigtut, where a beaching ramp was constructed for the PBYs. The aeroplanes began flying from here in diminishing daylight and worsening weather.

Although the intention had been to fly convoy support, the actual experience showed that this was unfeasible due to the severity of the operating conditions. Indeed, the aeroplanes were lucky to survive at all, and the air detachment finally threw in the towel on 20 October and proceeded back to Argentia.

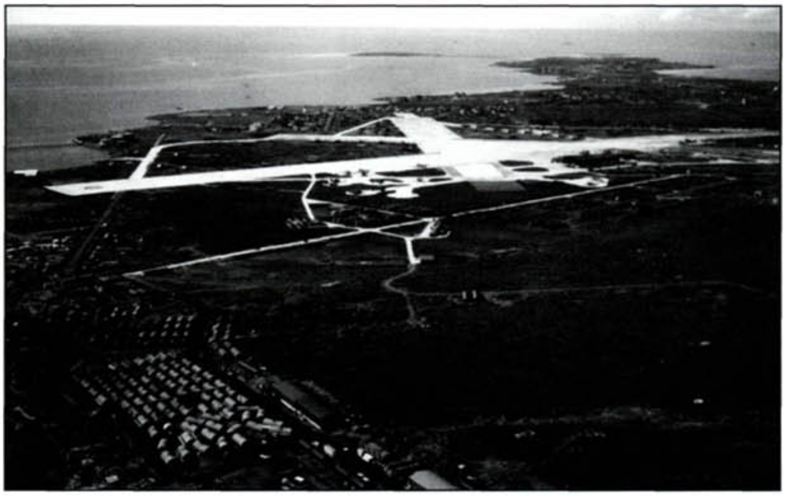
Because of the harshness of the weather, Greenland never became the important base for convoy support operations that its location might lead one to suspect. The ice, wind, fog, craggy mountains and labyrinthine fjords made it an unattractive location, especially in the darkness of winter. Nevertheless, with the construction of airfields at Narsarsuak and Søndre Strømfjord (now Kangerlussuaq), on Greenland's west coast, PatWing 7 would return in the summer of 1942, but this time with its amphibian PBY-5As.

CAMP 'KWITCHERBELLIAKIN'

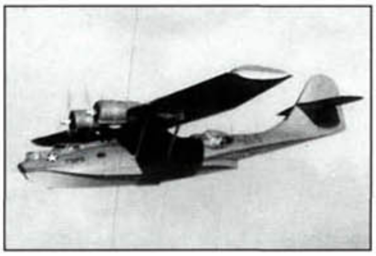
'Whoever possesses Iceland holds a pistol permanently pointed at England, America and Canada', wrote German strategist Karl Haushofer, and a quick glance at the map of the North Atlantic shows clearly the island's strategic location. The wisdom of the British move to occupy Iceland soon became apparent when, in the summer of 1940, German advances in Europe dramatically altered the whole shape of the war.

The opening of the long European coastline to German submarines constituted a major threat to the Atlantic sea lanes. Before long, Iceland, which can be likened to a huge aircraft carrier anchored in the middle of the North Atlantic, developed into the most important base for Allied air and surface anti-submarine operations in the whole North Atlantic.

Iceland's importance as an outpost in the defence of the western hemisphere from German aggression was the primary motive behind the agreement reached in 1941 between President Roosevelt and Prime Minister Winston Churchill to have US armed forces relieve the



This aerial view of Reykjavik Airfield in July 1942 was taken looking in a westerly direction from the base towards runway three – the photographer was sat in a PBY-5A of VP-73 at the time. Camp 'Kwitcherbelliakín' is seen in the lower left corner, and at least four PBY-5As are parked in the slipway area on the other side of the runway (*NARA 80-G-26020*)



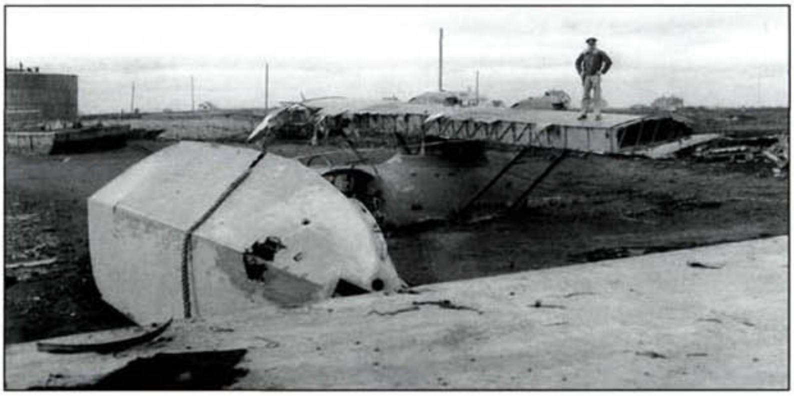
This rare inflight photograph of PBY-5 BuNo 2300/73P6 patrolling south of Iceland was taken from an Iceland-based RAF Hudson of No 269 Sqn in August 1941. When this shot was taken only a single PBY-5 from VP-71, VP-72, and VP-73 and two PBM-1s from VP-74 had been fitted with radar – BuNo 2300 was VP-73's radar aircraft. Its antennas appear to be identical to those fitted to PBY-2 BuNo 0456/54-P-10, seen on page 15. Note the bomb under the aircraft's wing, which appears to be a 250-lb demolition weapon (*No 269 Sqn Archives*)

British garrison in Iceland. On 7 July, exactly five months before the Japanese attacked Pearl Harbor, the first American troops set foot on the island. One month later, on 9 August 1941, the US Navy's Iceland Air Detachment came into being with the arrival in Reykjavik of six PBY-5s from VP-73 and six PBM-1s from VP-74

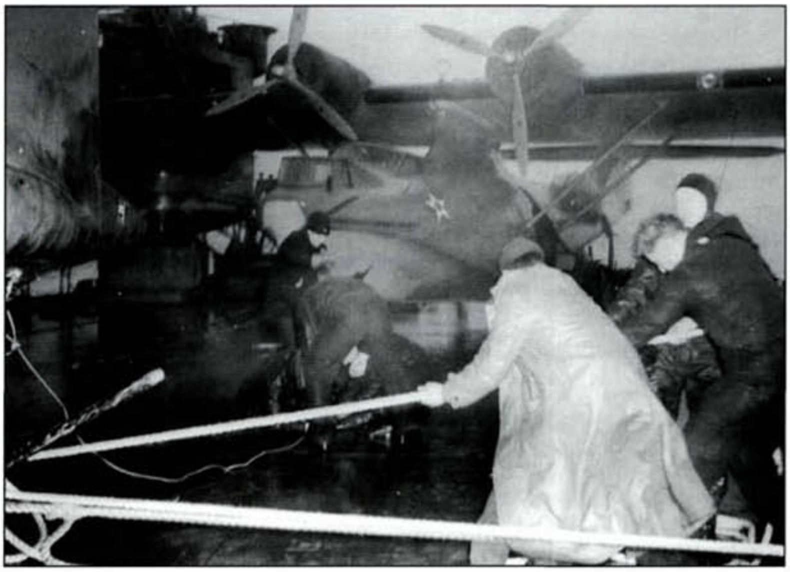
The Iceland Air Detachment commenced operations from the seaplane base in Skerjafjördur, which adjoined Reykjavik airfield. Its flying-boats were initially tendered by *Goldsborough*, but this was soon replaced by *George E Badger* – both vessels were converted World War 1 destroyers. At first, the aircrew lived aboard their PBYs, but shortly after their arrival, Army field tents was erected on a nearby beach.

In keeping with the primitive conditions facing these forerunners of fleet aviation in Iceland, the site was appropriately named Camp 'SNAFU' (Situation Normal, All F***** Up). Eventually, some Nissen huts were obtained from the British and a new camp was constructed on the eastern side of the airfield – humourously dubbed Camp 'Kwitcherbelliakín'. To add further to the eccentricity of the camp's name, its entrance was decorated with artificial palm trees made of old tubing wrapped in burlap, complete with sheet-metal leaves.

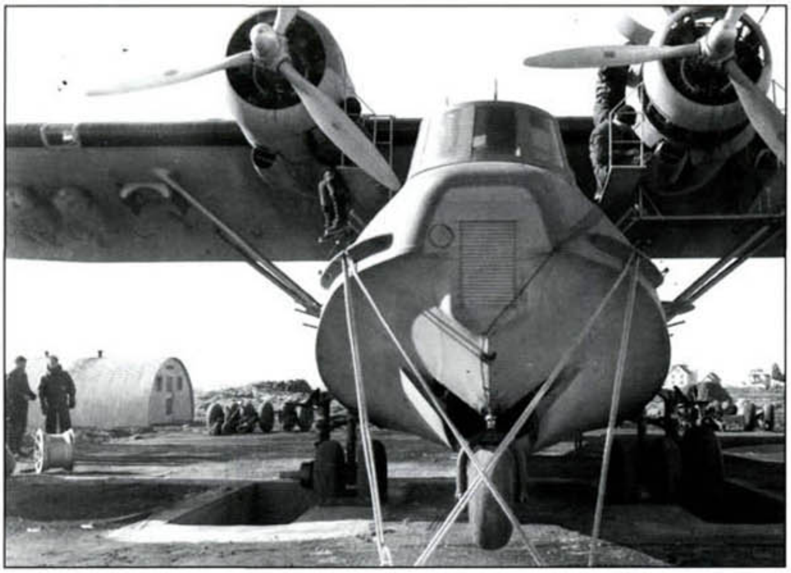
By mid-September 1941, the US Navy was escorting transatlantic merchant shipping two-thirds of the way to and from Great Britain, with air coverage being provided at each end by PBYs and PBMs of the Argentia and Iceland Air Detachments. The unsuccessful torpedo attack on the destroyer USS *Greer* (DD-145), followed by the torpedoing of USS *Kearny* (DD-432) and the sinking of USS *Reuben James* (DD-245) in the autumn of 1941, all testify to the proximity of hostile forces. Although America was not yet at war in the legal sense, a de facto state of war already existed between the USA and Germany, as



On 15 January 1942, the Fleet Air Base at Reykjavik was hit by a hurricane-force storm with winds gusting to 120 knots. Three PBY-5s of VP-73 (BuNos 2326, 2331 and 2337) and two PBM-1s of VP-74 (BuNos 1246 and 1255) broke their moorings and were destroyed (*NARA 80-G-27312*)



A new PBY-5A replacement for VP-73 rides out the 'big storm' on the deck of the *Albemarle* at Hvalfjord naval anchorage, Iceland, on 15 January 1942, while men struggle to secure PBY-5 '73P12' (almost certainly BuNo 2333), which is being returned to the USA (*NARA 80-G-464037*)



A PBY-5A of VP-73 undergoes a routine maintenance inspection at Reykjavik in early 1942. The aeroplane is sitting on beaching gear while the landing gear is lowered into the two check pits. Note the torpedo rack under the right wing inside the depth charges. Iceland-based PBYs usually carried these in anticipation of being called upon at short notice to go after German surface raiders such as the *Tirpitz*, attempting to break into the Atlantic (*NARA 80-G-27361*)

the two countries were engaged in belligerent operations in every practical sense.

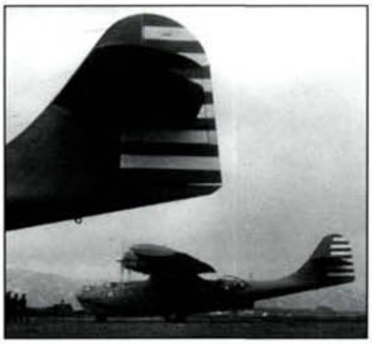
When the British withdrew their Catalina squadron from Iceland in October 1941, the US Navy was well aware of the fact that this location was unsuitable for seaplane operations in winter. By the time the PBMs of VP-74 were withdrawn, and VP-73 re-equipped with the PBY-5A to become the first squadron to receive the new amphibious version of the PBY, six aeroplanes had been lost at their moorings in winter storms.

THE LULL BEFORE THE STORM

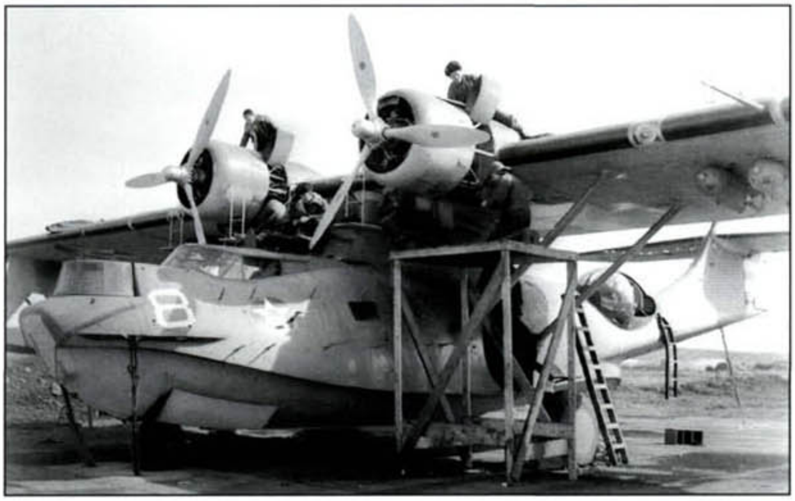
As previously mentioned, following the attack on Pearl Harbor, PatWing 7 was practically stripped of its long-range air patrol capability when two of its three PBY-5 squadrons (VP-71 and VP-72) were ordered to the Pacific to make up for the heavy losses suffered in the Japanese attack. The only compensation came in the form of VP-82, equipped with medium-range PBO-1 Hudsons. The squadron reported to the wing in Argentia in late December so as to allow the remaining PBYs of VP-73 and VP-74 to transfer to milder climes too.

Despite their lack of range, it was the PBOs of VP-82 that accounted for the first two German U-boats to be sunk by the US Navy in World War 2. Both U-656 and U-503 fell victim to VP-82 off the Newfoundland coast in March 1942.

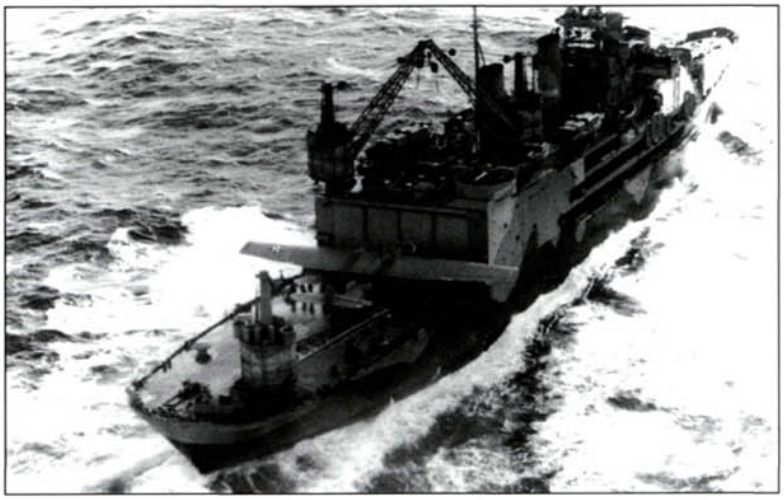
With the bulk of the U-boat campaign being carried out against shipping in the Western Atlantic, the PBY-5As of the Iceland Air Detachment made but a single contact with the enemy during the first seven months of 1942. This occurred on 17 February, when VP-73's PBY-5A BuNo 2461/10 (pilot unknown) dropped a single 325-lb depth charge on U-352 whilst it patrolled 60 miles west of Reykjavik. Two of



PBY-5As of VP-73 are seen at RAF Station Kaldadarnes, Iceland, in March 1942. The aeroplane in the foreground is BuNo 2458. Although not yet applied, side numbers were already assigned, with this aircraft being allocated the number 8 (*IWM CS 387*)



Seen a month later undergoing maintenance in Reykjavik, BuNo 2458 now features its white side number. Note the red centre to the national insignia and red/white rudder stripes (*NARA 80-G-17849*)

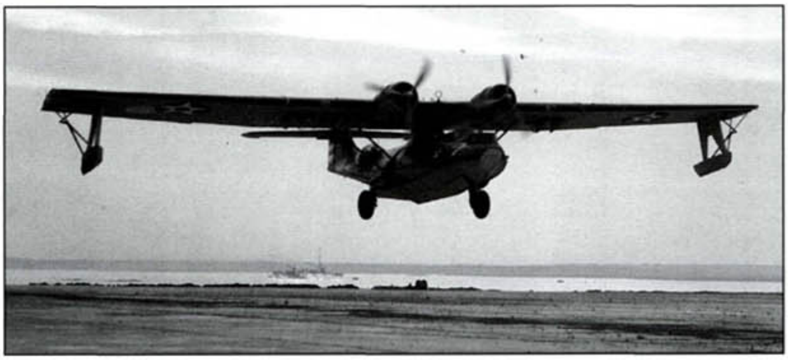


The seaplane tender *Albemarle*, with a PBY secured to its rear deck area, ploughs through moderate swells off the Icelandic coast in the spring of 1942 (*Naval Historical Center NH 90206*)

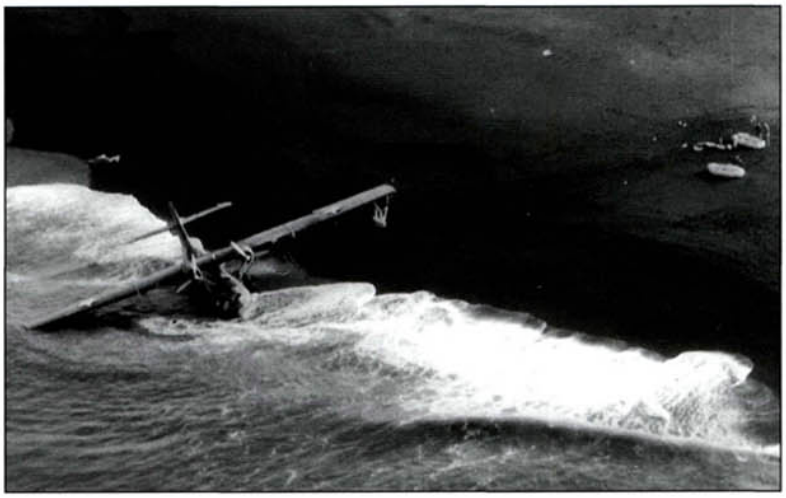
the aeroplane's four depth charges hung up and a fourth did not release, so U-352 escaped unscathed, but heavily shaken. The U-boat's luck would run out two months later, however, when it was sunk off Cape Hatteras, in North Carolina, by the US Coast Guard Cutter *Icarus*.

In May 1942, VP-93 (flying PBY-5As) was added to PatWing 7 in Argentia, while VP-73's second division departed Quonset Point to join the rest of the unit in Iceland. It was a happy reunion, marking the first time since October 1940 that the squadron was united at the same base. On 1 June 1942 VP-84 also reported to PatWing 7 in Argentia, relieving VP-82, which was transferred to PatWing 9 and the Eastern Sea Frontier. Hence, when the U-boats shifted their offensive back to the North Atlantic convoy routes in July 1942, PatWing 7 had a modest force consisting of just three PBY-5A squadrons, spread thinly along the North Atlantic convoy route from Newfoundland to Iceland, with which to take them on.

Although PatWing 7 was unable to run the (*text continues on page 43*)

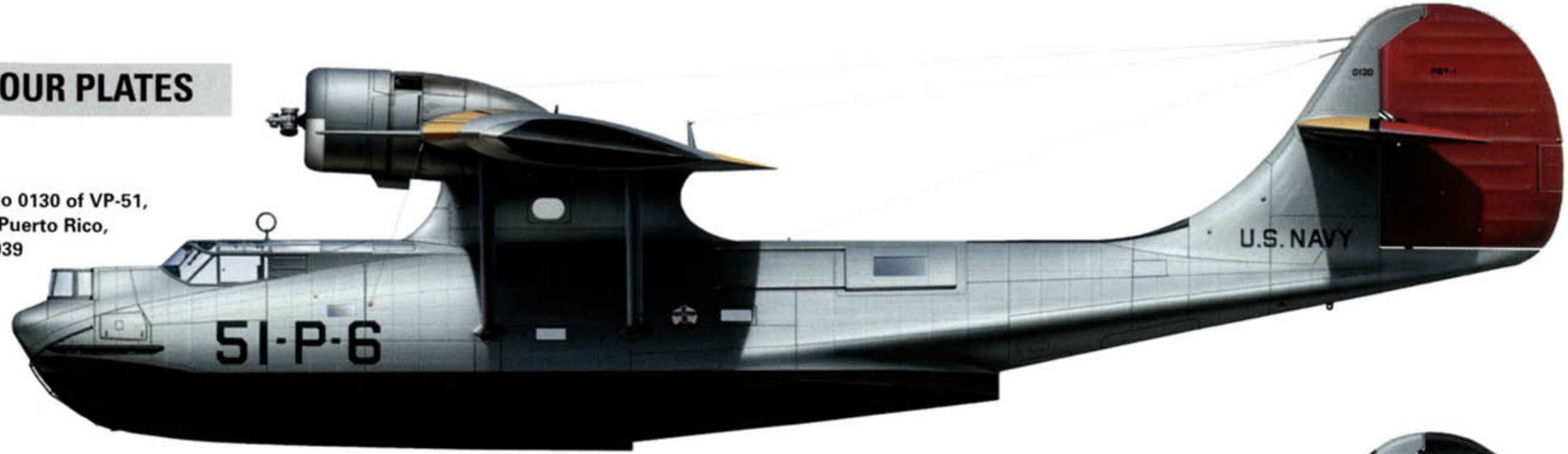


VP-73's BuNo 2456/7 takes off from runway 02 at Reykjavik in April/May 1942. This particular aeroplane was the first production PBY-5A amphibian built by Consolidated. In 1943 it was transferred to the USAAF for search and rescue duty in the Mediterranean, and the PBY was subsequently shot down by German fighters into the Bay of Salerno, off the Italian coast, whilst performing this mission on 23 August 1943 (*IWM CS 259*)

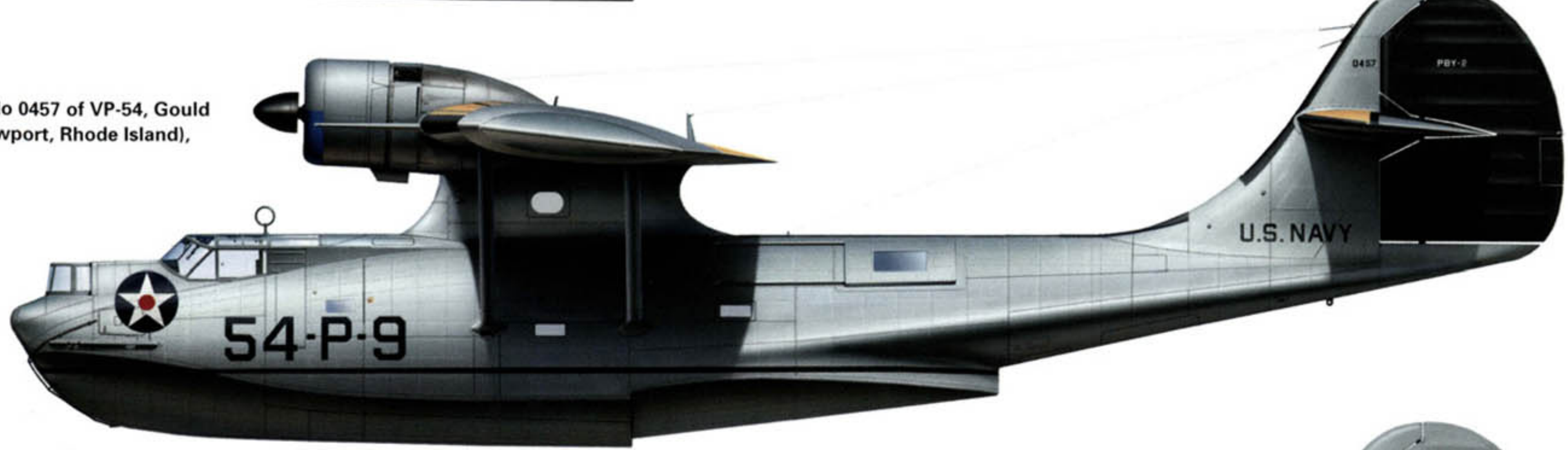


VP-73's PBY-5A BuNo 2458/8 wallows helplessly in the surf on Iceland's south coast after being mistakenly shot up by an Allied merchant convoy on 20 June 1942. With three of his crew seriously wounded and the aeroplane badly hit, Lt William Cole flew the crippled PBY back some 300 miles before making landfall. With one engine dead and the other failing, the aircraft was ditched upon reaching the coast. The injured were brought ashore in two rubber life rafts before the aeroplane was beached. Later, its engines and other equipment were removed and the airframe blown up (*NARA 80-G-27505*)

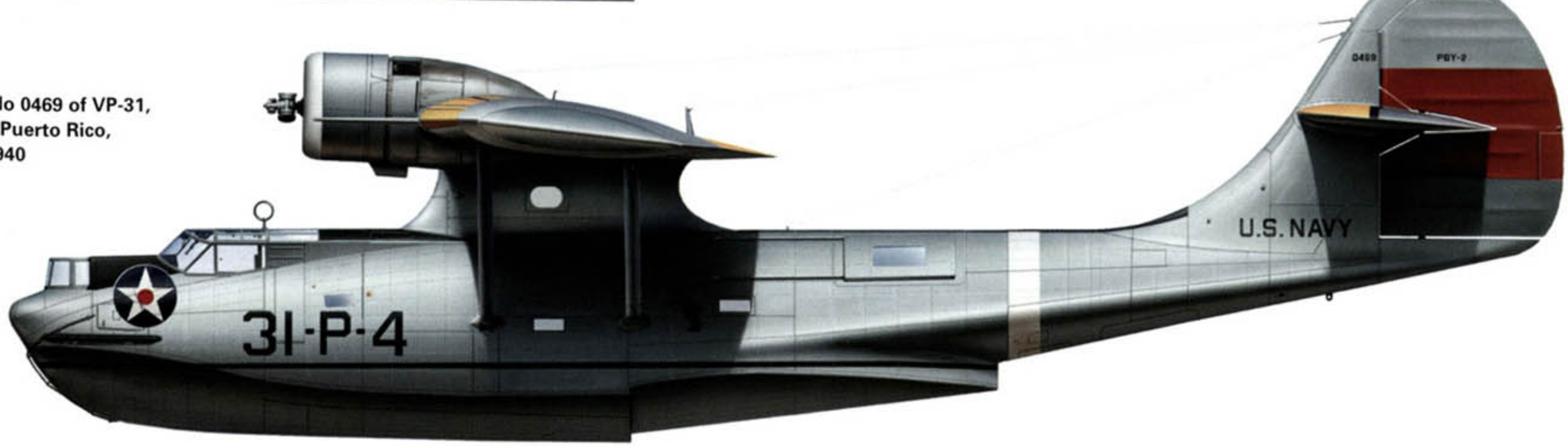
COLOUR PLATES


51-P-6
U.S. NAVY
0130
PBY-1

1
PBY-1 BuNo 0130 of VP-51,
San Juan, Puerto Rico,
October 1939

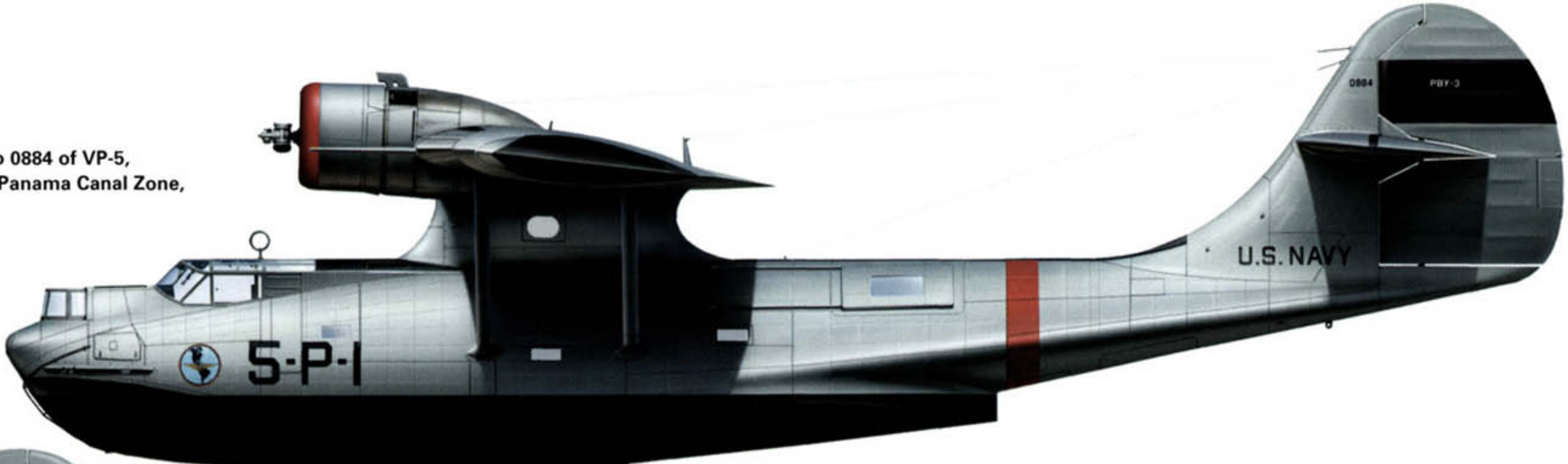

54-P-9
U.S. NAVY
0457
PBY-2

2
PBY-2 BuNo 0457 of VP-54, Gould
Island (Newport, Rhode Island),
1939-41

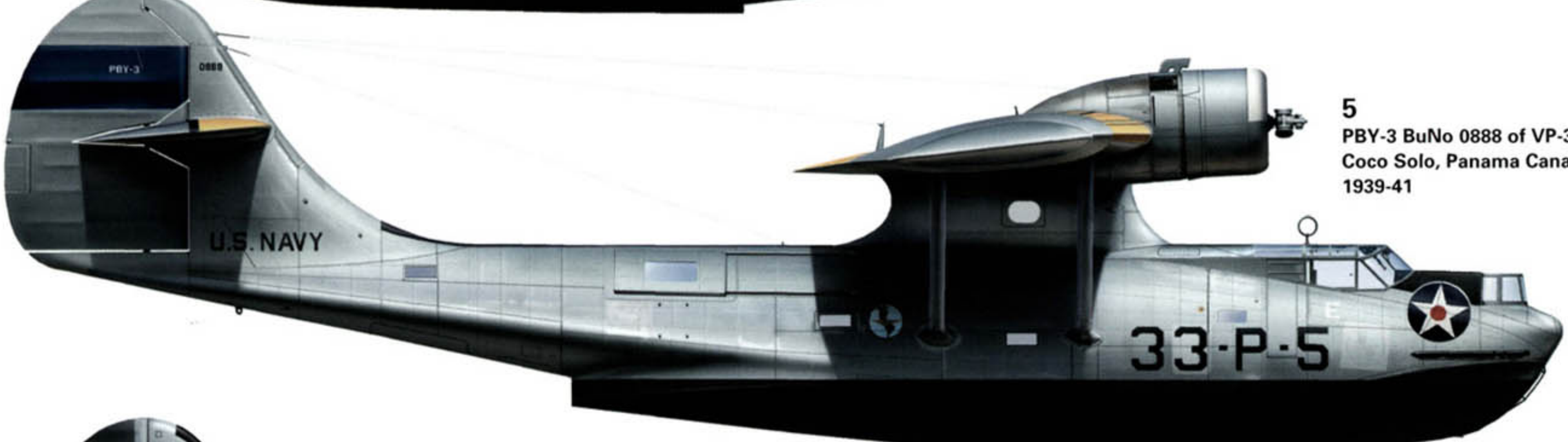

31-P-4
U.S. NAVY
0469
PBY-2

3
PBY-2 BuNo 0469 of VP-31,
San Juan, Puerto Rico,
October 1940

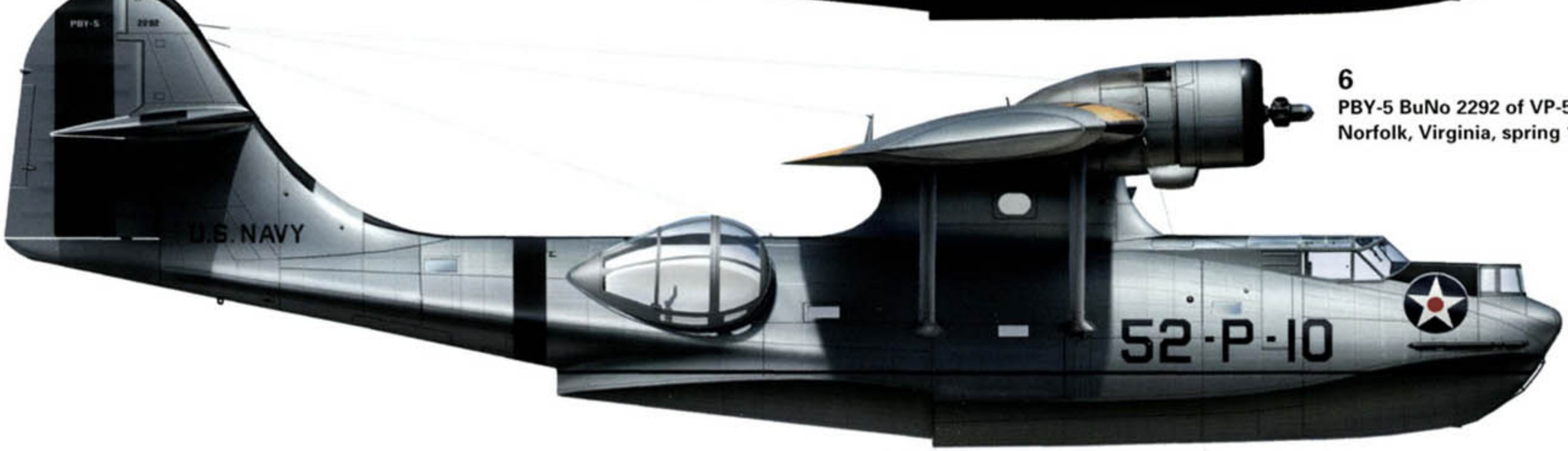
4
PBY-3 BuNo 0884 of VP-5,
Coco Solo, Panama Canal Zone,
1938-39

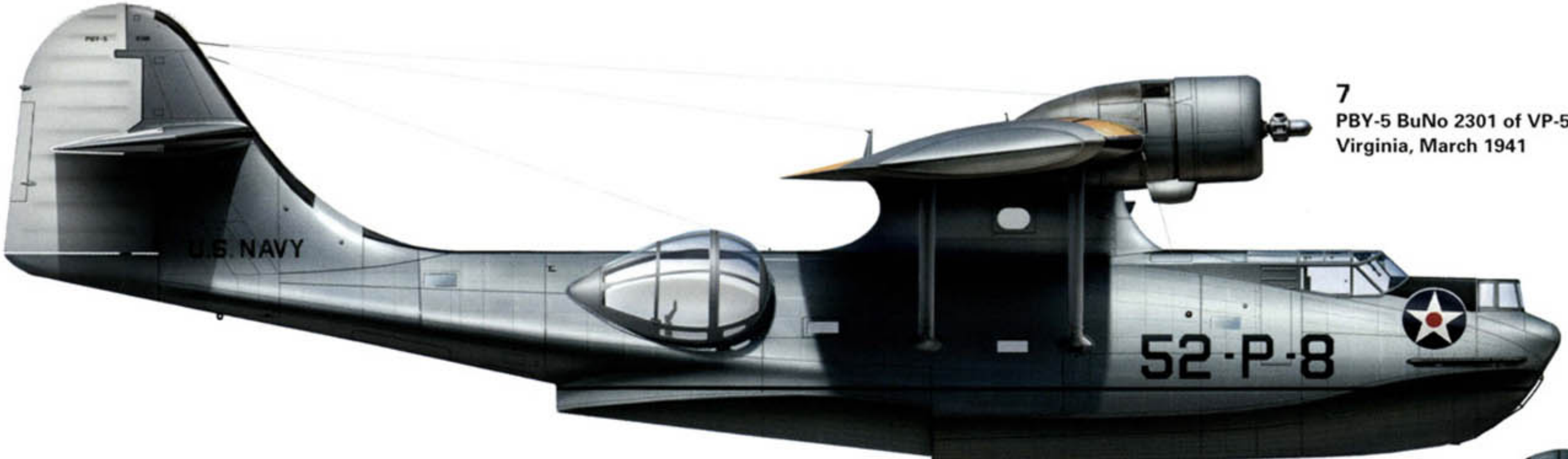

0884
PBY-3
U.S. NAVY
5-P-1

5
PBY-3 BuNo 0888 of VP-33,
Coco Solo, Panama Canal Zone,
1939-41


PBY-3
0888
U.S. NAVY
33-P-5

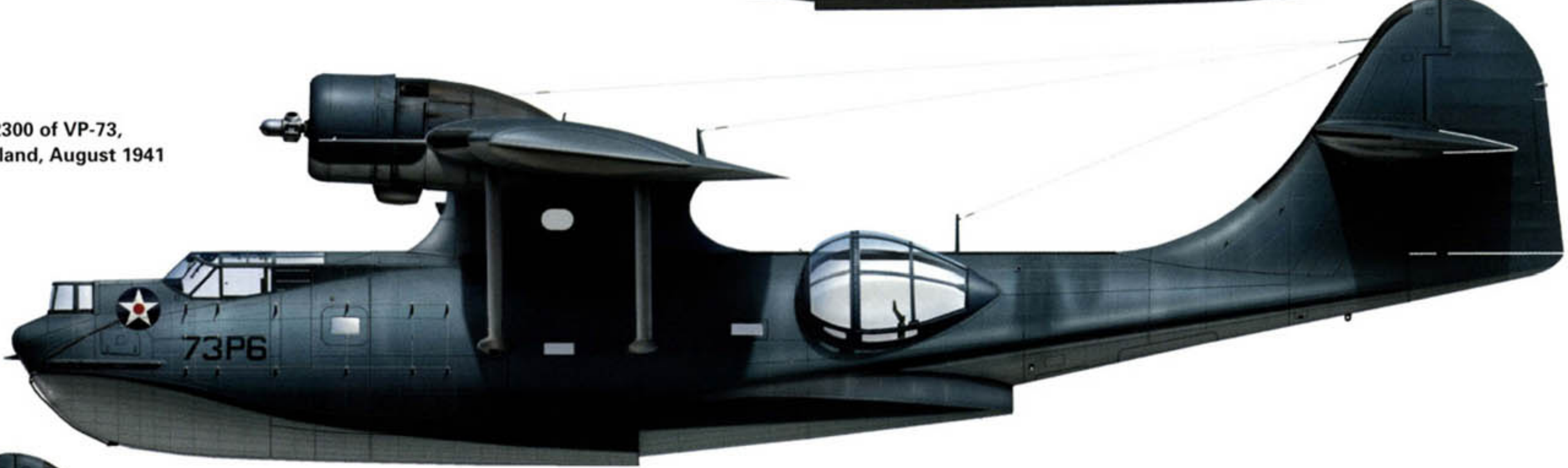
6
PBY-5 BuNo 2292 of VP-52,
Norfolk, Virginia, spring 1941

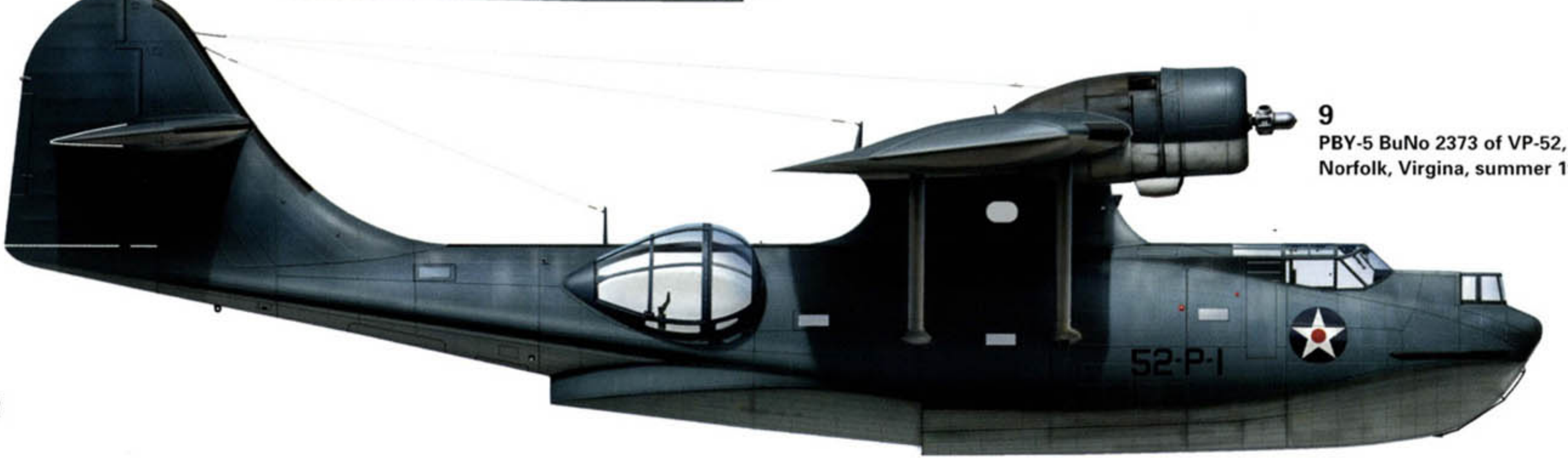

PBY-5
2292
U.S. NAVY
52-P-10


U.S. NAVY
52-P-8

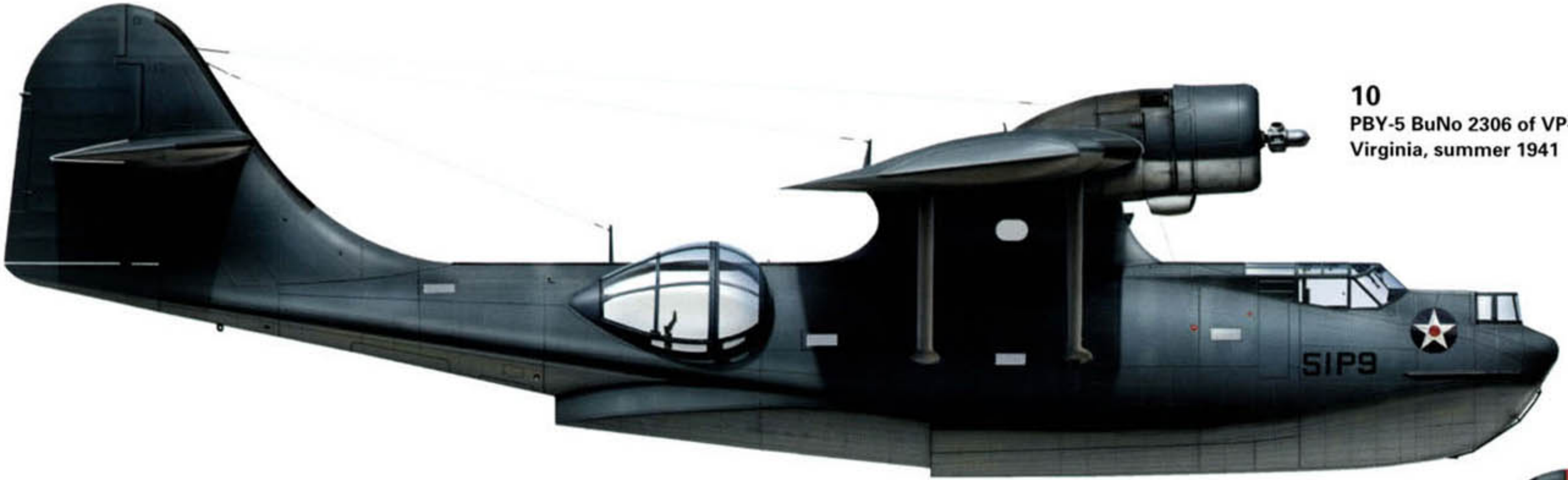
7
PBY-5 BuNo 2301 of VP-52, Norfolk, Virginia, March 1941

8
PBY-5 BuNo 2300 of VP-73, Reykjavik, Iceland, August 1941

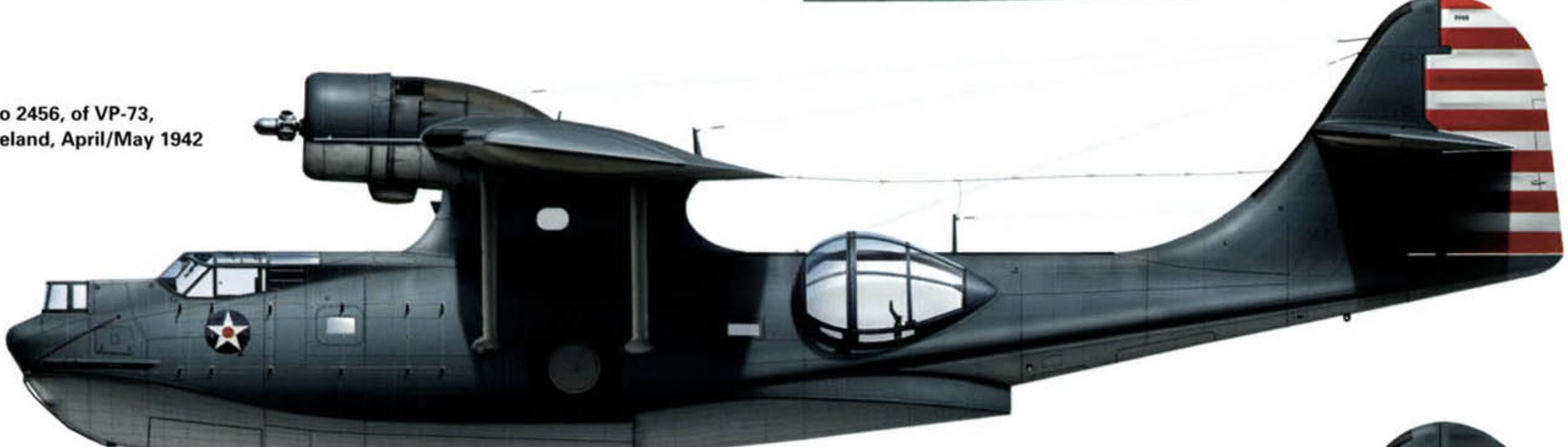




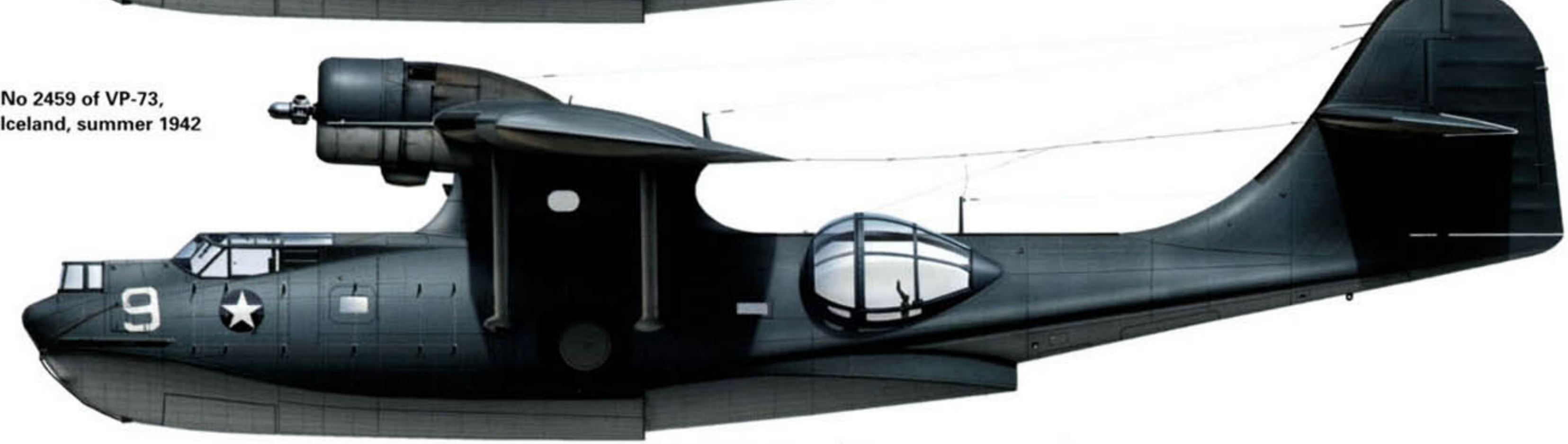
9
PBY-5 BuNo 2373 of VP-52, Norfolk, Virgina, summer 1941



10
PBY-5 BuNo 2306 of VP-51, Norfolk,
Virginia, summer 1941



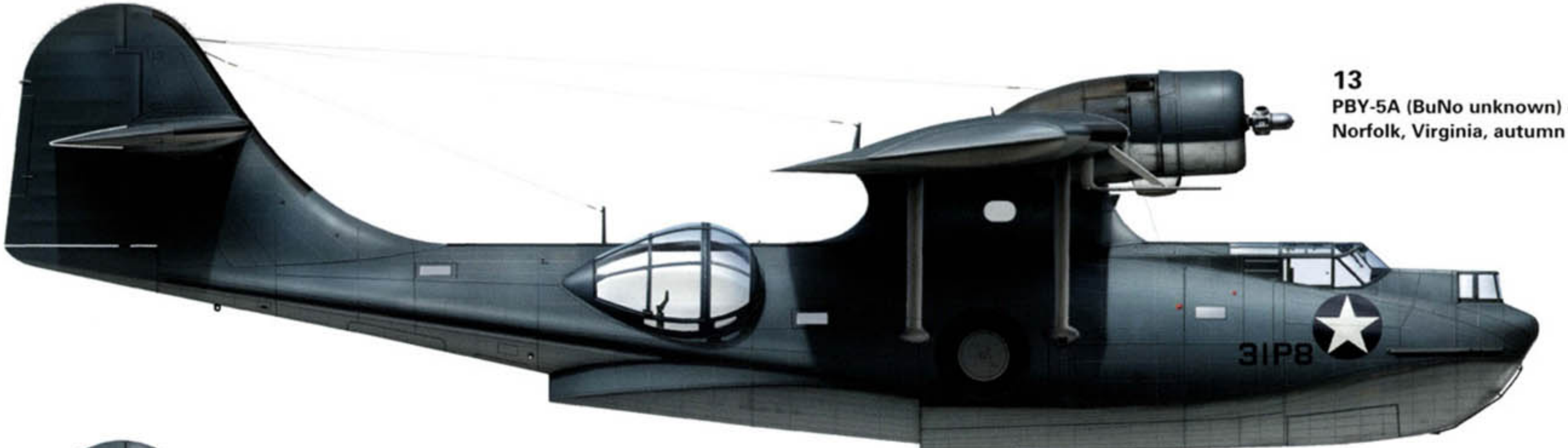
11
PBY-5A BuNo 2456, of VP-73,
Reykjavik, Iceland, April/May 1942



12
PBY-5A BuNo 2459 of VP-73,
Reykjavik, Iceland, summer 1942

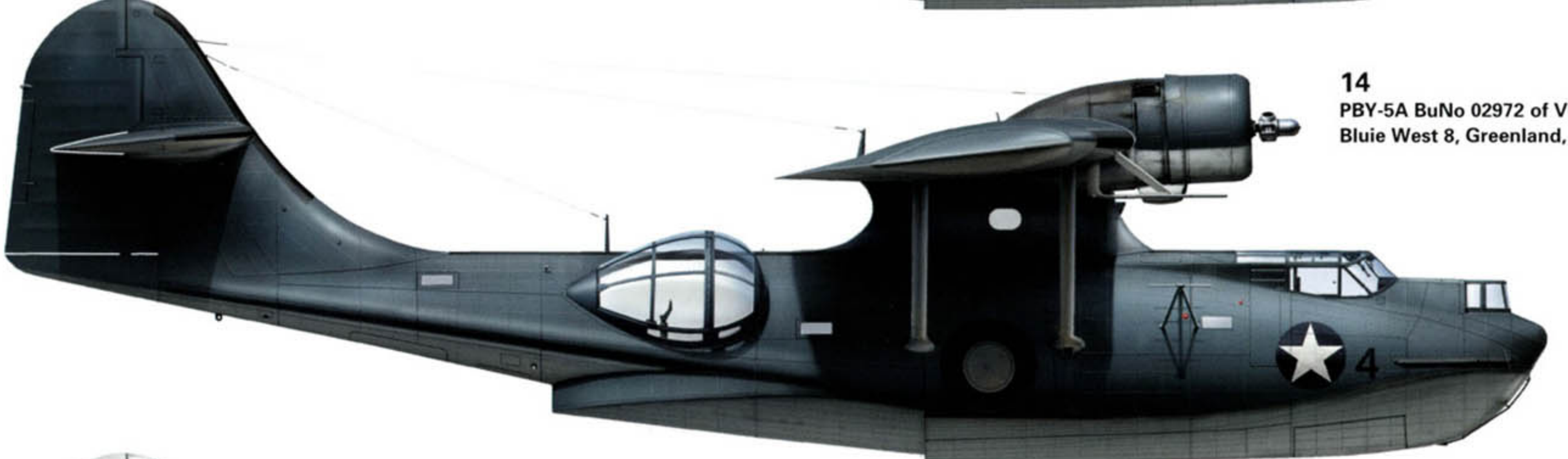
13

PBY-5A (BuNo unknown) of VP-31,
Norfolk, Virginia, autumn 1942



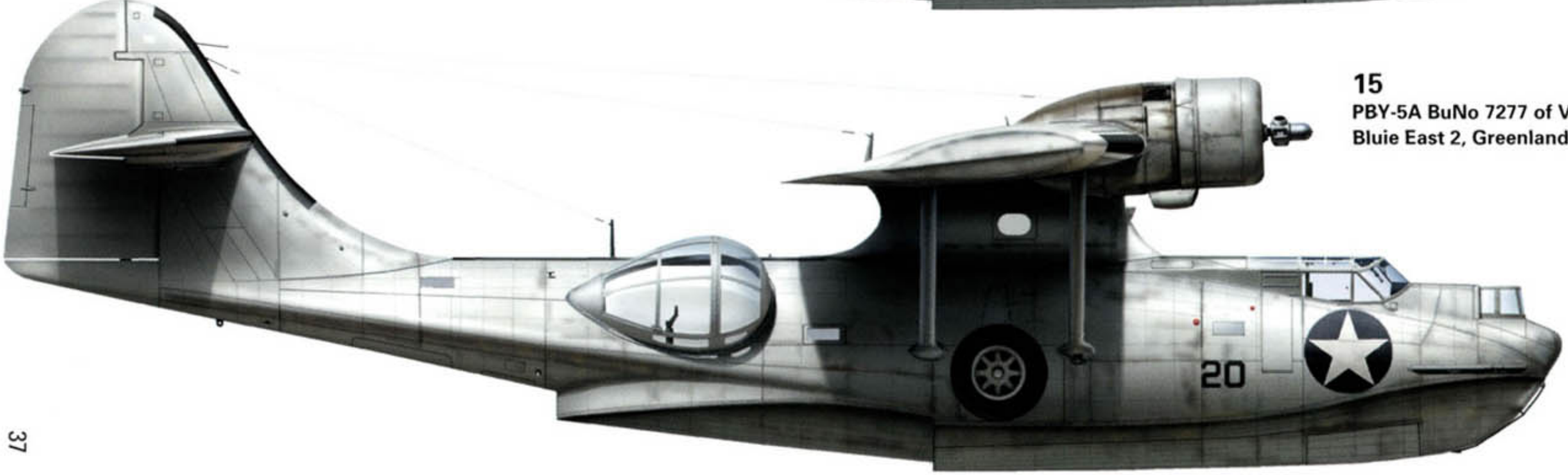
14

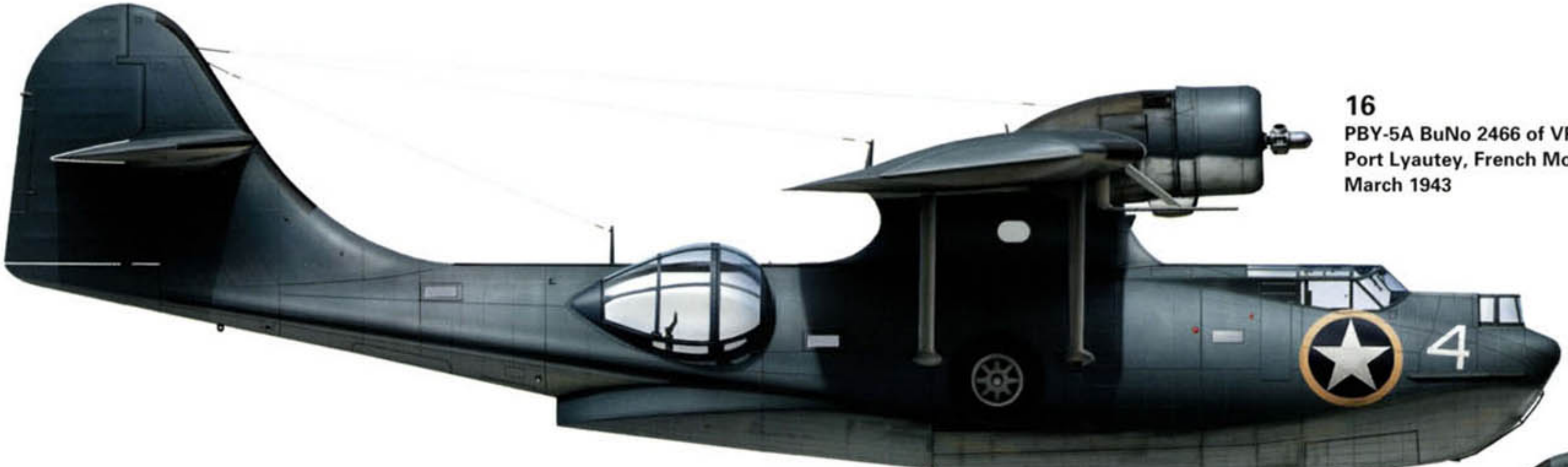
PBY-5A BuNo 02972 of VP-93,
Bluie West 8, Greenland, July 1942



15

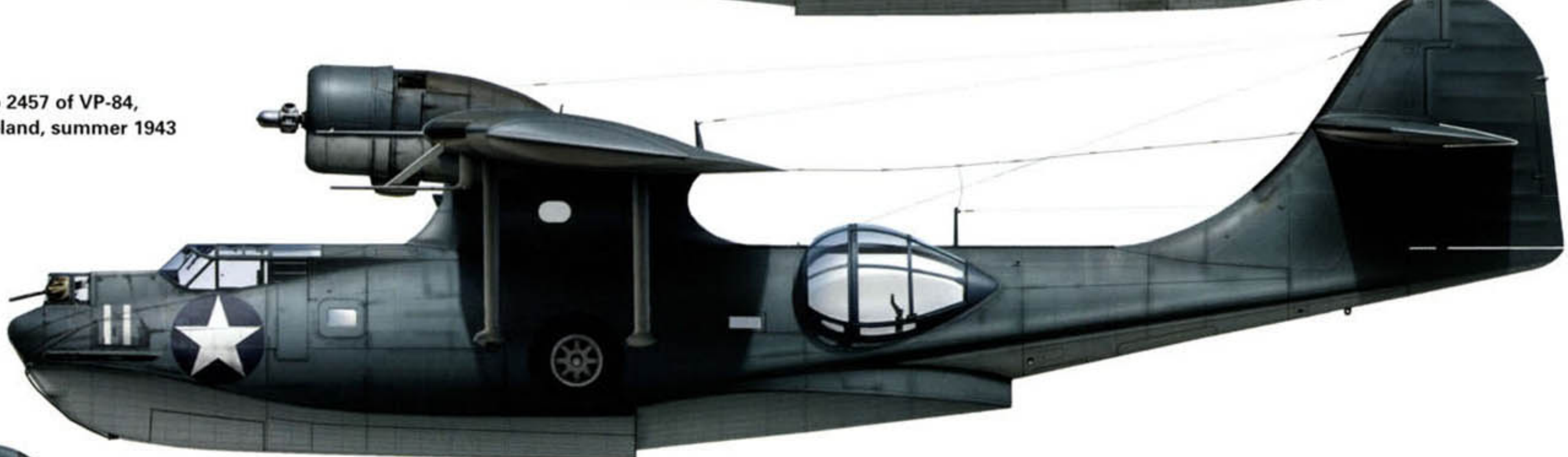
PBY-5A BuNo 7277 of VB-126,
Bluie East 2, Greenland, March 1943





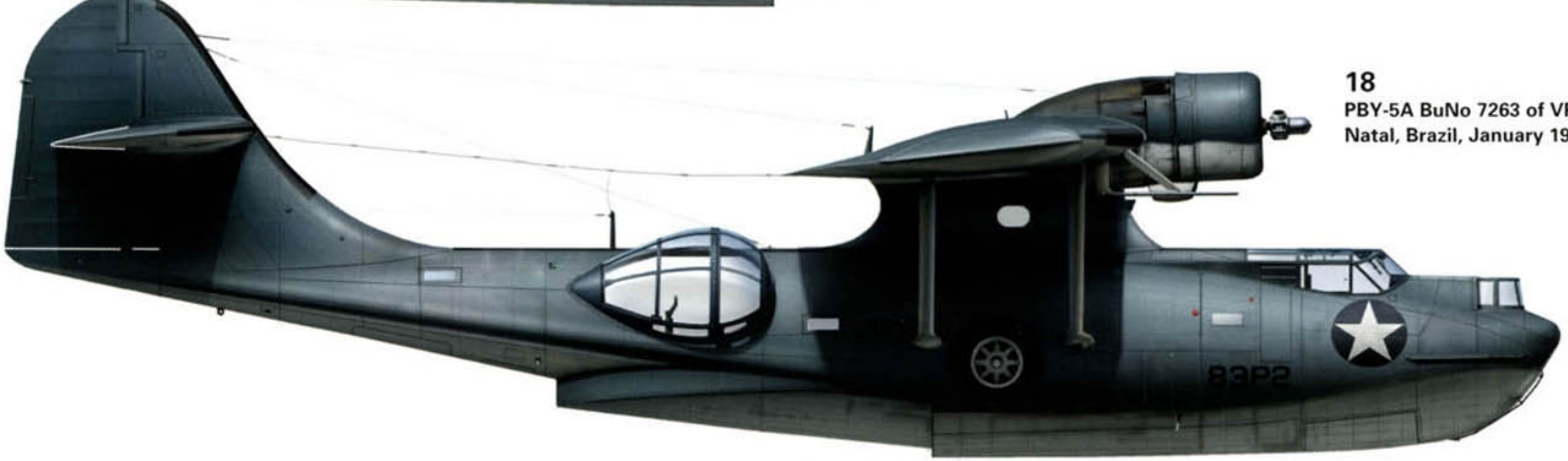
16

PBY-5A BuNo 2466 of VP-73,
Port Lyautey, French Morocco,
March 1943



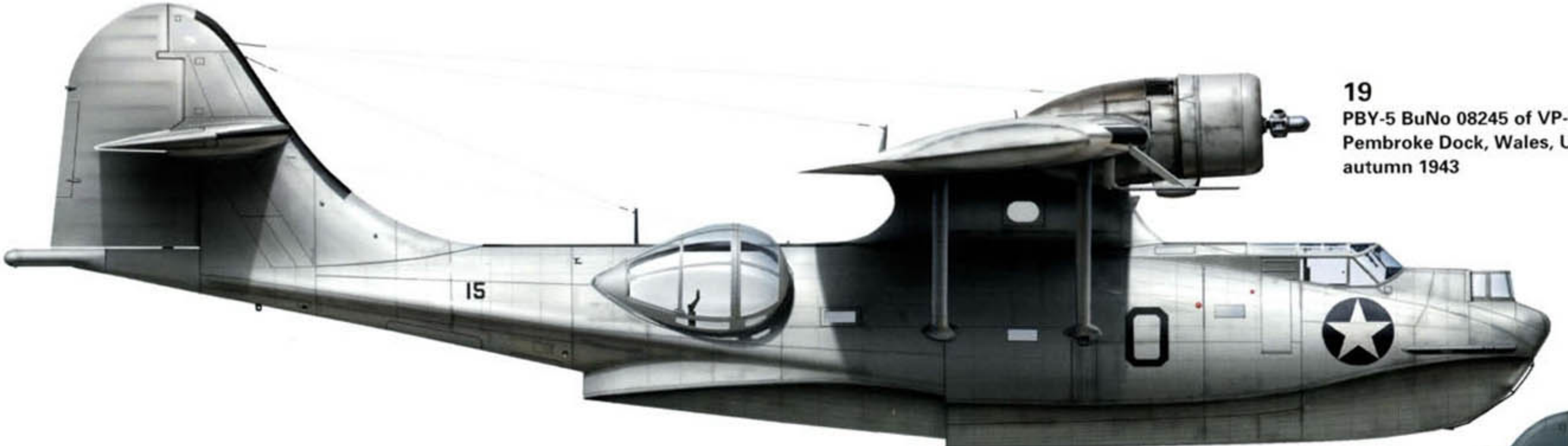
17

PBY-5A BuNo 2457 of VP-84,
Reykjavik, Iceland, summer 1943



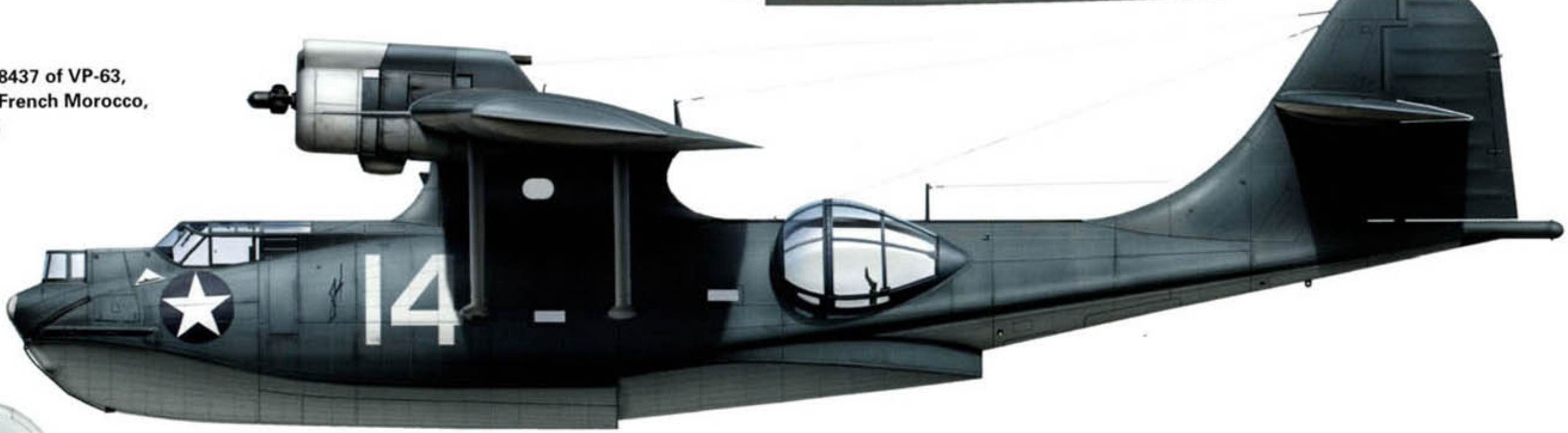
18

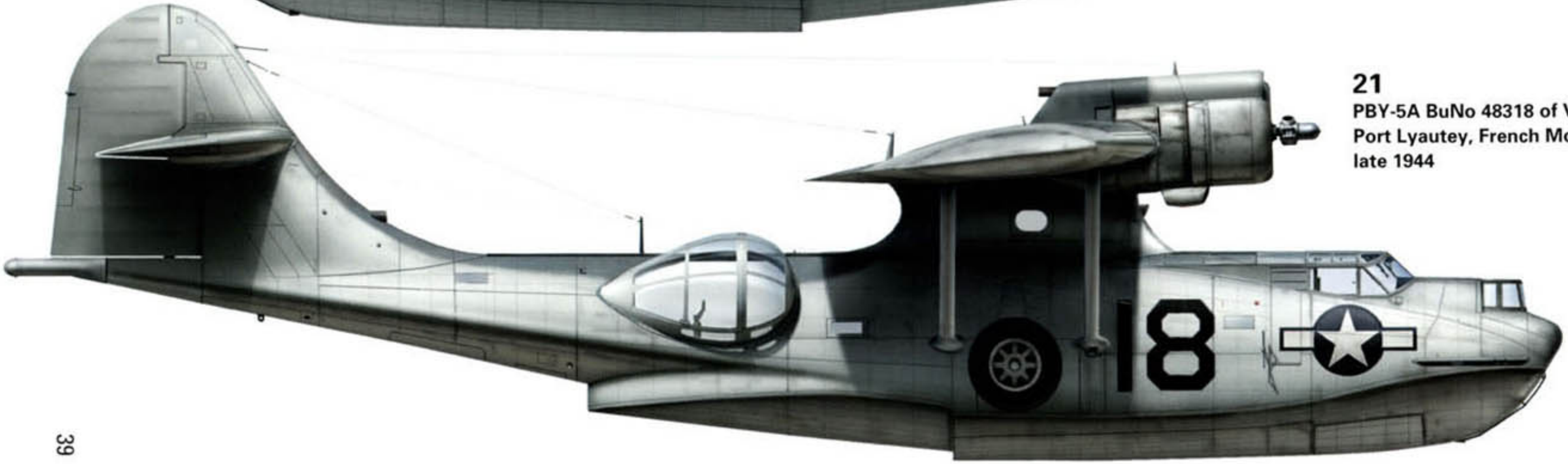
PBY-5A BuNo 7263 of VP-83,
Natal, Brazil, January 1943



19
PBY-5 BuNo 08245 of VP-63,
Pembroke Dock, Wales, UK,
autumn 1943

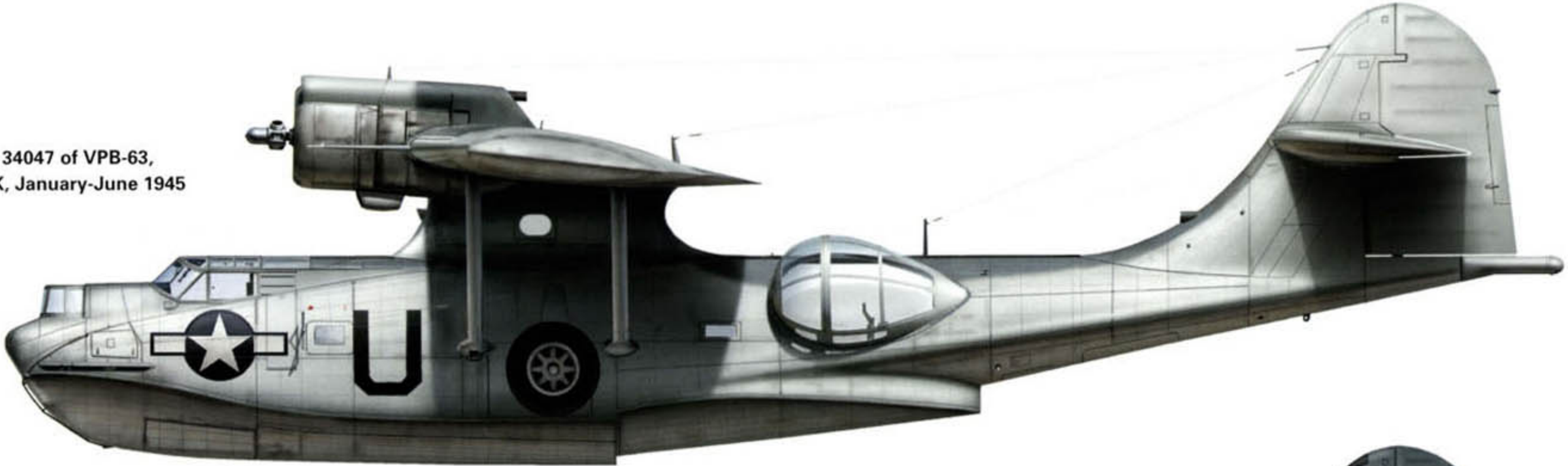
20
PBY-5 BuNo 08437 of VP-63,
Port Lyautey, French Morocco,
February 1944



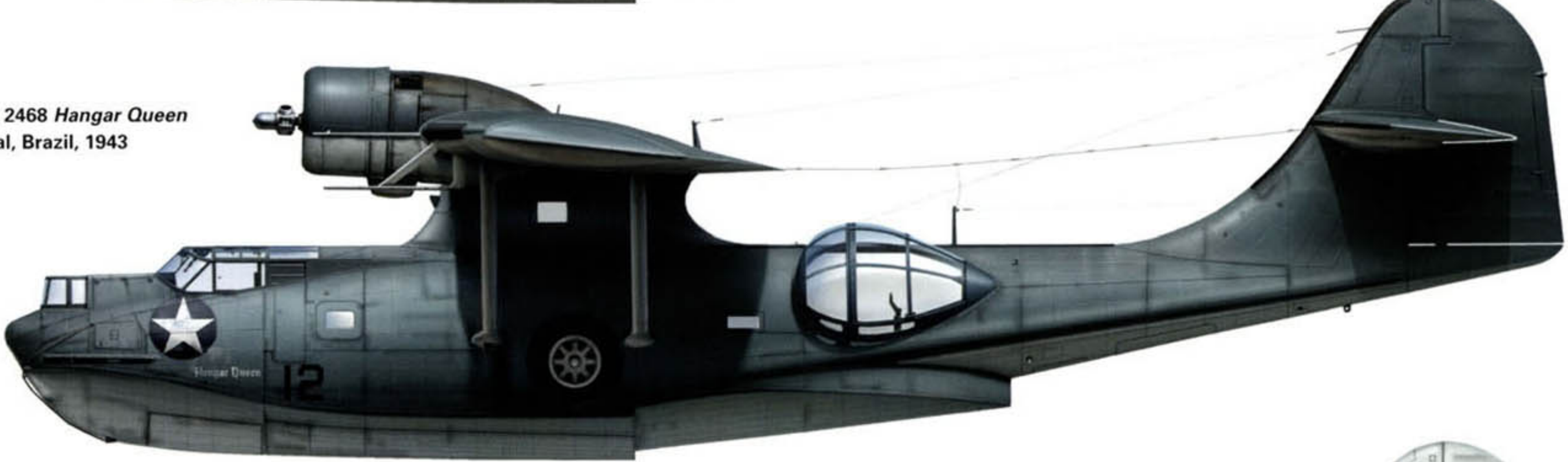


21
PBY-5A BuNo 48318 of VPB-63,
Port Lyautey, French Morocco,
late 1944

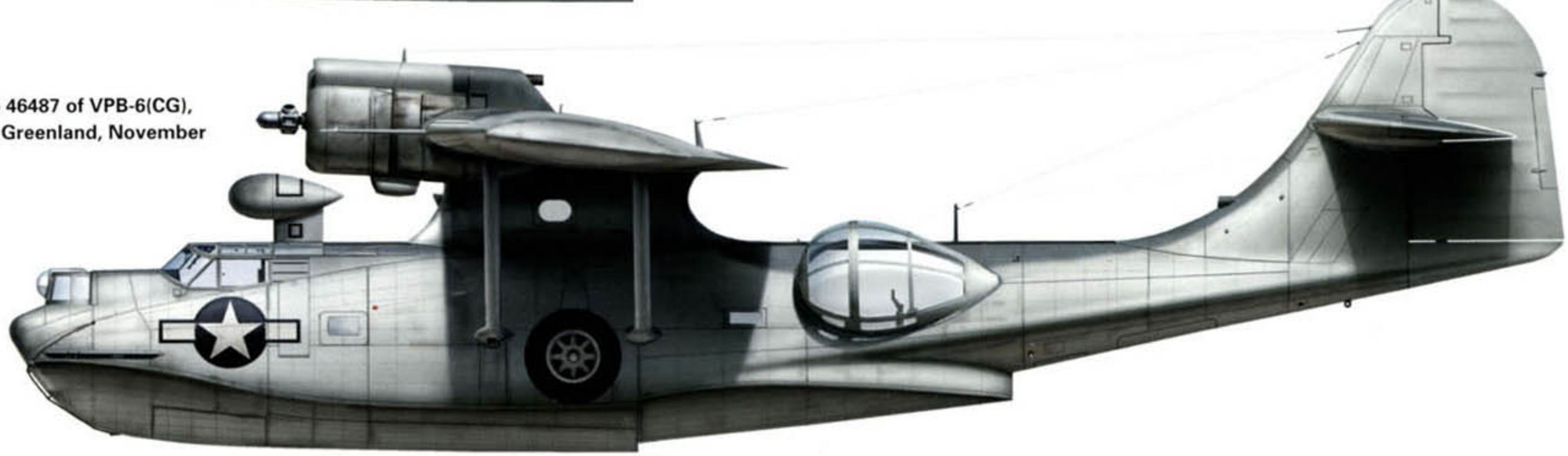
22
PBY-5A BuNo 34047 of VPB-63, Uppottery, UK, January-June 1945



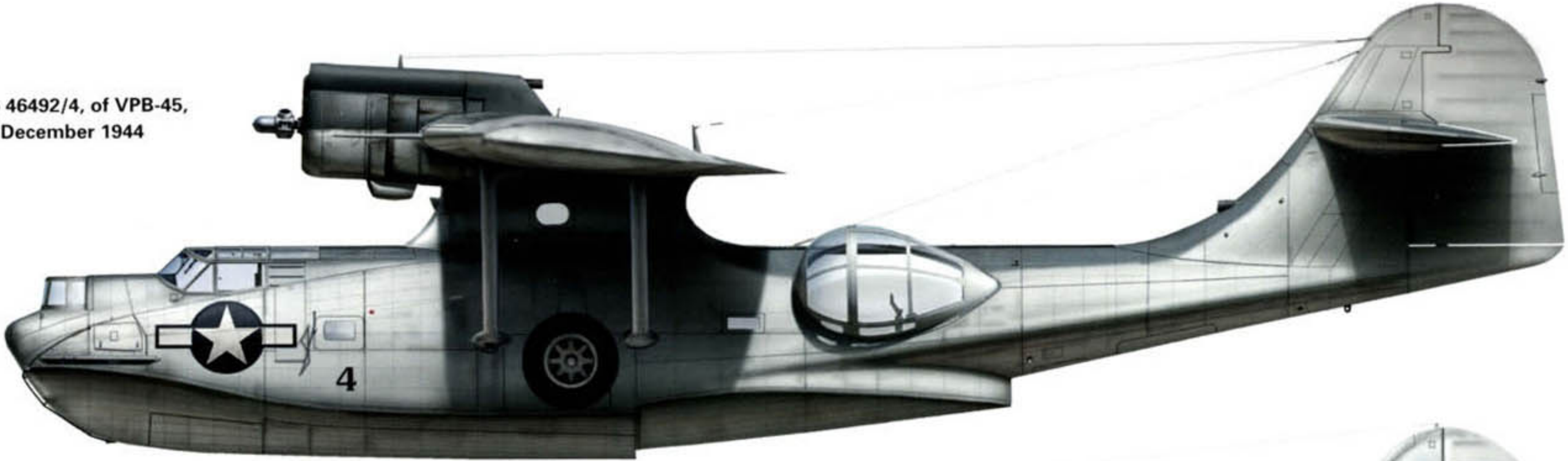
23
PBY-5A BuNo 2468 *Hangar Queen* of VP-94, Natal, Brazil, 1943



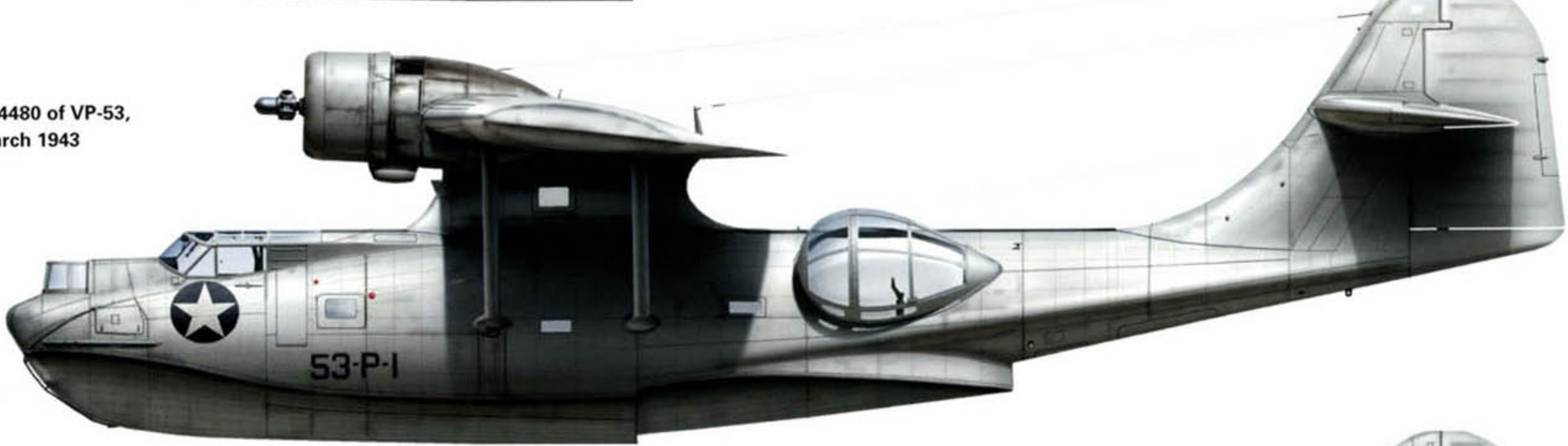
24
PBY-5A BuNo 46487 of VPB-6(CG), Bluie West 1, Greenland, November 1945



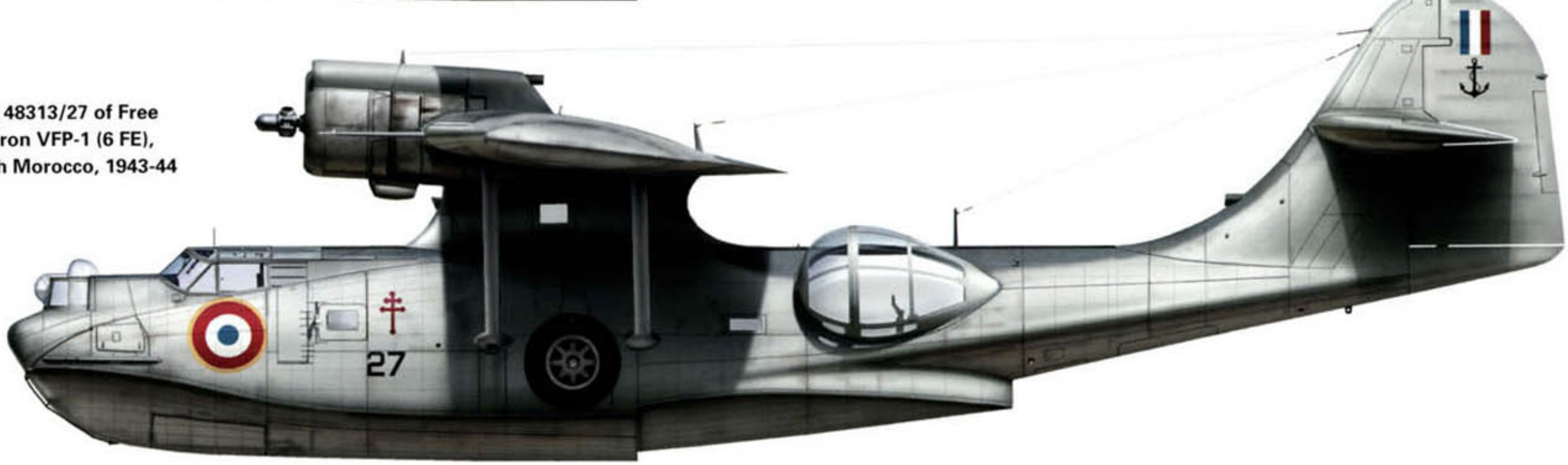
25
PBY-5A, BuNo 46492/4, of VPB-45,
Belém, Brazil, December 1944

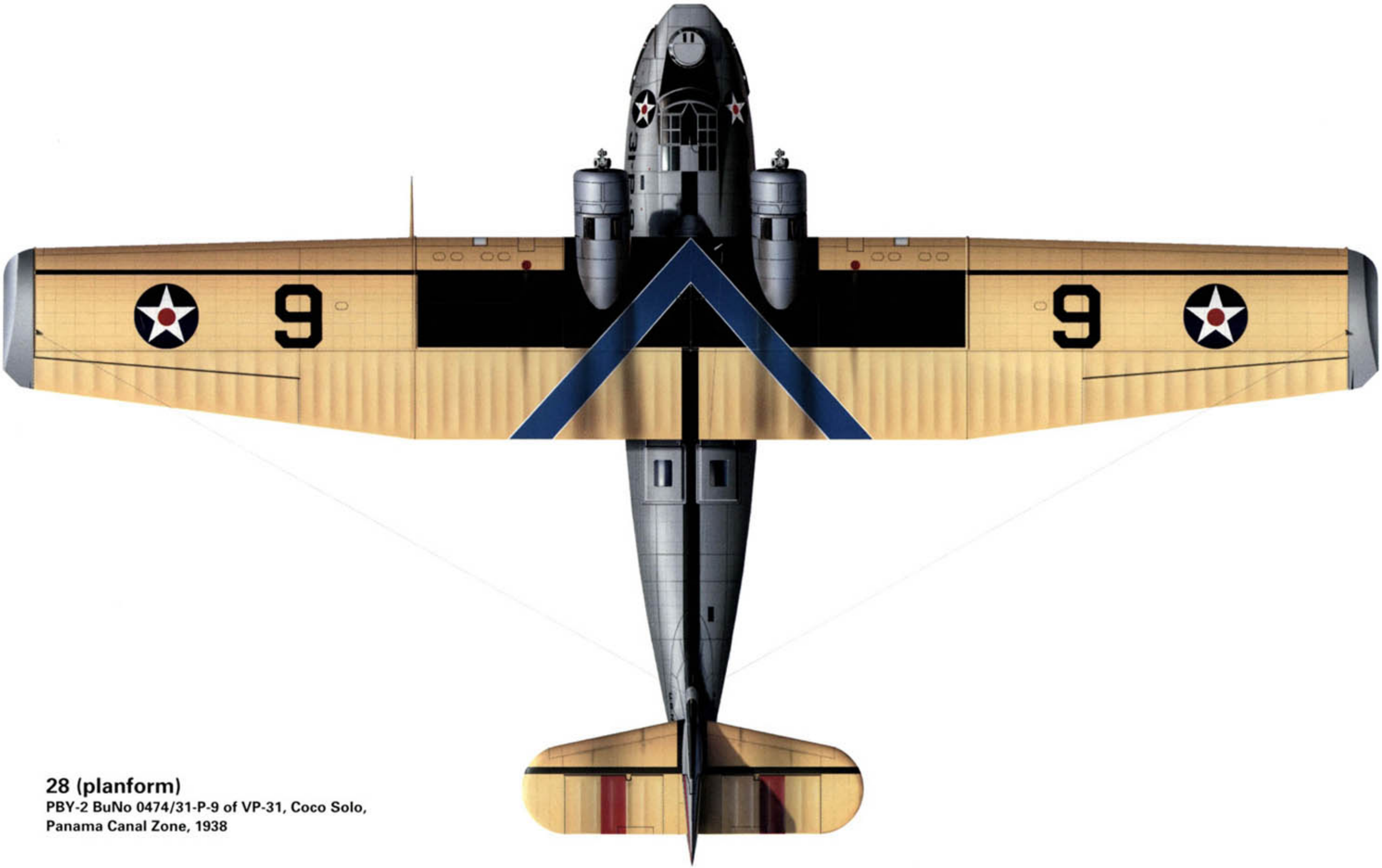


26
PBY-5 BuNo 04480 of VP-53,
Trinidad, 8 March 1943



27
PBY-5A BuNo 48313/27 of Free
French Squadron VFP-1 (6 FE),
Agadir, French Morocco, 1943-44





28 (planform)
PBY-2 BuNo 0474/31-P-9 of VP-31, Coco Solo,
Panama Canal Zone, 1938

U-boats out of the North Atlantic, its squadrons nevertheless prevented them from halting Allied convoys, thus earning the wing the highest respect from friend and foe alike.

RESUMPTION OF CONVOY WARFARE

Following the introduction of coastal convoys off the US Eastern Seaboard, the U-boats were promptly deprived of any rewarding targets in this area. In July 1942, the few submarines still operating in the area were ordered to withdraw and take up positions off Nova Scotia. Meanwhile, the bulk of the U-boat offensive had shifted southward to the Caribbean and the Gulf of Mexico, where merchant ships sailing independently of convoys offered ample targets.

Admiral Dönitz was well aware that this favourable situation for his U-boats could not last long. Eventually, the anti-submarine defences would be strengthened and the coastal convoy system extended to cover these areas as well. As early as May 1942, he expressed this judgment in a report to the *Führer*, stating his intentions to divert large numbers of U-boats to convoy warfare in the North Atlantic when their deployment in American waters ceased to be profitable.

In July 1942 the Germans resumed convoy warfare in the North Atlantic with the despatching of a ten-U-boat strong 'wolfpack'. The first North Atlantic convoy to feel the weight of the enemy's new campaign was the slow eastbound SC 94, which lost 11 ships of 53,000 tons to the U-boats. VP-73 took an active part in this convoy battle, and others that followed, and by the time the unit left Iceland in October 1942, its PBYs had delivered 30 attacks against U-boats, sinking two and inflicting damage on many more. The decisive phase of the Battle of the Atlantic had begun.

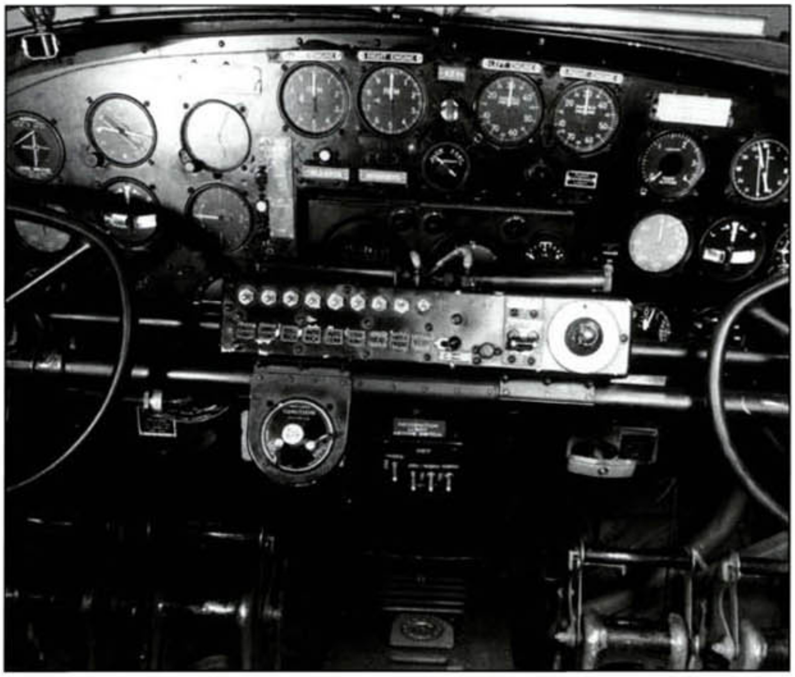
It was during this period that the first U-boat fell victim to a PBY of the US Navy when Kapitänleutnant Otto Harms' U-464 (a valuable Type XIV *milchkuh* U-tanker on its maiden voyage to replenish U-boats in the mid-Atlantic) was sunk by VP-73 PBY-5A BuNo 2459/9 during the morning of 20 August 1942.

Lt(jg) Robert B Hopgood had taken off from Reykjavik at 0300 hrs to cover a British naval task force that was passing southeast of Iceland. Shortly before dawn, whilst flying under a cloud base at an altitude of just 500 ft some 250 miles southeast of Iceland, he spotted U-464 in conditions of restricted visibility.

After establishing that the object sighted was indeed an enemy submarine, Lt(jg) Hopgood immediately attacked the vessel with five 325-lb Mk 17 depth charges that he released from a height of 100 ft directly across the U-boat's beam in what appears to have been a perfect straddle (the sixth bomb failed to release). The explosion lifted the U-boat almost clear of the water, and it was very evidently badly damaged.

A crewman aboard a VP-73 PBY-5A patrolling out of Reykjavik took this photograph soon after the aircraft took up station overhead the transatlantic merchant convoy. It does not take much imagination to realise just how difficult it must have been to spot a small target like a submarine in seas of this kind (*80-G-213061*)

The PBY had a well equipped galley with an electric stove for cooking meals during the 12-hour patrols. When the electrical bomb release mechanism repeatedly malfunctioned, it was suspected that the galley's appliances were drawing too much current, causing a drop in battery voltage. As a result, use of the stove was restricted to heating soup and coffee, much to the displeasure of the aircrews (*NARA 80-G-17863*)

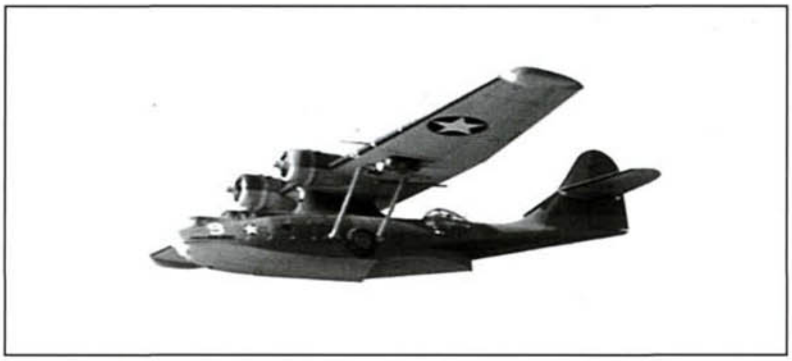


The instrument panel of a PBY-5A. The switch panel in the centre of the photo was for the pilots to relay instructions to the flight engineer sitting in the 'tower' (wing pylon). The latter was responsible for starting up and cutting the engines, adjusting fuel mixture controls and raising or lowering the wing floats. Access to the bow was under the instrument panel between the two pilots (*NARA 80-G-324966*)

Following the attack, Hopgood made several strafing runs, firing his 0.30- and 0.50-cal machine guns, to which the enemy replied with accurate anti-aircraft gunfire that forced the PBY crew to withdraw to a safe distance – upon the aircraft's return to base, groundcrew discovered 25 small shrapnel holes in its wings. Unable to dive on account of the damage inflicted by the PBY's depth charges, Kapitänleutnant Harms decided to head for nearby Icelandic fishing vessel *Skaftfellingur* and scuttle his U-boat before enemy warships arrived on the scene. All bar two of U-464's 54-man crew were rescued by the Icelandic seamen and shortly thereafter transferred to a British destroyer.

Hopgood's attack on U-464 duly gave birth to the since-famous US Navy phrase 'Sank sub, open club'. The Iceland Air Detachment was commanded by one Capt (later Rear Adm) Daniel V Gallery Jnr, who was a tough and uncompromising naval officer. Gallery was utterly distressed with VP-73's failure to sink U-boats. Over the past several weeks the squadron had delivered some seven attacks, all of which were 'muffed' in his opinion. He possibly felt that the poor performance of his crews was caused by too many late nights spent in the Officers Club, so he ordered the latter closed until the squadron had sunk a U-boat.

Following Hopgood's attack, all ears at Coastal Command HQ in Iceland were glued to the radio listening to his reports of the dramatic developments taking place out at sea. The reports were all framed in very official language, which was, of course, coded. Finally, when the British destroyer took the German sailors off the Icelandic fishing vessel,



Armed with 325-lb Mk 17 depth charges, VP-73's BuNo 2459/9 heads out on patrol in gale-force winds. Not only was BuNo 2459 the first US Navy PBY to sink an enemy submarine (U-464 on 20 August 1942), but it was to finish the war as the most successful Allied anti-submarine bomber of any type, with three U-boats sunk and a fourth severely damaged to its credit (*IWM CS 304*)

CAMP
KWITCHERBELLIAKÍN

Lt Robert B Hopgood and his crew with their squadron and air base Commanders in front of the Camp 'Kwitcherbelliakín' sign following their successful attack on U-464 on 20 August 1942. Standing, from left to right, are Lt Robert B Hopgood, Lt Cdr Alexander S Hayward (VP-73's CO), Ens Bradford M Dyer, Capt Daniel V Gallery (FAB Iceland's CO) and Ens Robert A McCracken. Kneeling, from left to right, are AMM1c D M Martin, ARM2cs Grant Patton and Richard A Clark, RM2c L L Presnell, S1c Keith L Terwilliger and AMM1c Cornelius Simmons (*US Navy, courtesy of Keith L Terwilliger*)

Hopgood's last report was made in plain English, without any code – 'Sank sub, open club'. And they sure did!

South of Iceland, the convoys were under constant threat from U-boat attacks. On 5 October, five of VP-73's PBYs were ordered to cover the eastbound New York-Liverpool convoy HX 209 as it came out of the air gap 400 miles south of Iceland, hotly pursued by the 17-boat-strong *Luchs* (Lynx) 'wolfpack'.

Chief Aviation Pilot (CAP) Manuel 'Manny' Luke was flying BuNo 2459/9 on this date, his aircraft having previously sunk U-464 two months earlier. Soon after arriving on station, Luke's crew spotted a U-boat 15 miles ahead of the convoy's starboard column. Diving from 2000 ft, the pilot dropped his four 650-lb Mk 29 depth charges from 75 ft in a perfect straddle which saw two bombs fall either each side of the U-boat's hull. U-582 (Kapitänleutnant Werner Schulte) and its 46-man crew were sent immediately to the bottom of the ocean. BuNo 2459/9 now had two U-boats to its credit, and more success was yet to come for the PBY.

5 October 1942 proved to be a field day for the air escorts, who had fought hard to protect the convoy in spite of miserable weather conditions. All but one of the five PBYs attacked a U-boat during the course of the day, and besides CAP Luke's sinking of U-582, U-257 narrowly escaped destruction at the hands of Ens William B Huey Jnr in BuNo 02974/12. The U-boat was forced to break off its pursuit of HX 209 and return to port for repairs, while U-602 was also damaged to a lesser degree by Lt Willoughby Mercer in BuNo 7300/10.

Moreover, RAF aeroplanes conducting anti-submarine sweeps in the convoy's vicinity had also delivered three attacks; one of which led to the sinking of U-619 by an Iceland-based Hudson of the RAF's No 269 Sqn.

As a direct result of this strong air coverage, the 'wolfpack' was driven away from the convoy and ordered by U-boat Command headquarters to break off its attacks at first light the following morning. Once again, the PBY had proven its worth. For the rest of its passage HX 209 sailed unmolested, having lost just one tanker to the enemy. For Admiral Dönitz, the operation was a total failure – only one ship sunk for the loss of two U-boats destroyed and a third badly damaged.

VP-84 JOINS THE BATTLE

October saw VP-73 replaced in Iceland by VP-84, which had flown in from Argentia. About half of VP-73's PBYs were already en route back to the United States when the squadron received orders to return to Iceland, and thence to North Africa once an airfield had been secured following the Operation *Torch* landings in Morocco and Algeria on 8 November. VP-73 finally bid farewell to Iceland and headed to the UK just prior to

This aerial view of NAS Argentia, in Newfoundland, was taken in August 1942. Five PBY-5As can be seen parked around the hangar in the top right hand corner of the photograph. Both VP-84 and VP-93 were based here with PBY-5As at this time (*NARA 80-G-17994*)

this date, leaving VP-84 to deal with the 'wolfpacks', but not before trading in several of its war-weary PBY-5As for some of VP-84's newer aeroplanes. One of the flying-boats turned over to VP-84 was double U-boat killer BuNo 2459, whose side number now changed from '9' to '7'.

In early November the enemy had two 'wolfpacks' in place to strike against the next convoys to traverse the North Atlantic, and it was to one of these that U-613 and U-664 were in the process of joining when they became the targets of VP-84's first attacks since arriving in Iceland. The two U-boats were en route to their allocated patrol positions southwest of Iceland when they came in contact with PBY-5As carrying out a sweep 400 miles from base.

The first to be attacked was U-613, which Lt Robert C Millard, in BuNo 08037/1, succeeded in slightly damaging prior to it diving out of site. U-664 was not so lucky, however, as Lt(jg) Phillip A Bodinet's attack in BuNo 2464/10 forced the U-boat to abort its patrol and limp back to port for repairs.

Of all the disagreeable and dangerous duties facing the Allies in the North Atlantic, protecting the Arctic convoys heading for northern Russia was by far the worst. By September 1942 18 such convoys had made the run, but after the decimation of PQ 17 and PQ 18 by German aircraft, U-boats and surface ships, the northern Russian run was abruptly halted. Instead, a 'trickle' of supplies were shipped to the USSR from Iceland aboard unescorted fast merchantmen. North of Iceland, U-boats patrolled the area in an effort to intercept any ships attempting the 'Russia run', and on 5 November VP-84 claimed its first victim when it sank U-408 whilst patrolling this route.

In a cruel twist of fate, this date also happened to be the 28th birthday of the vessel's captain, Kapitänleutnant Reinhard von Hymmen.

Three of VP-84's PBY-5As had been conducting anti-submarine sweeps 100 miles off Iceland's north coast when Lt Robert C Millard, flying BuNo 7273/8, sighted a fully surfaced U-boat four miles away. Without hesitation, Millard flung the PBY into a 180-mph diving turn and attacked the submarine head-on, dropping two 325-lb Mk 17 and two 650-lb Mk 29 depth charges in salvo from a height of 125 ft as he swept over the U-boat from bow to stern. The lookouts aboard U-408 were clearly taken by surprise, as the crew of the PBY spotted eight or nine men in the conning tower as the flying-boat passed overhead.

The depth charges straddled the U-boat, hitting the water about 40 ft immediately aft of the conning tower. When they exploded, the sea erupted in a huge tower of water that engulfed the U-boat and washed the men on the bridge overboard. Once the explosion had subsided, seven sailors were seen struggling amidst the wreckage in a large patch of oil that

CAMP
KWITCHERBELLIAKIN

Lt Robert C Millard and his crew pose for an official photograph after sinking U-408 on 5 November 1942. Standing in the back row, from left to right, are Lt(jg)s James J Walsh and William A Shevlin, Lt Robert C Millard and Lt (jg) George S 'Smittie' Smith. Kneeling in the front row, from left to right, are ARM2cs Roy B Carthen and J P Smith, AMM1c John Vasu (Plane Captain) and ARM1c L M Neale. Missing from this shot is AMM3c K A Mattingly, who was also on the U-boat-sinking flight (*USN via William A Shevlin*)

marked the spot where the U-boat had sunk.

Millard circled the scene for almost an hour before returning to base, but for reasons not explained in the crew's report, no attempt was made to drop a life raft or emergency rations to the men in the water. By the time the PBY left the scene of the attack, the few surviving submariners had all perished in the bitterly cold sea.

Bob Millard's outstanding attack was an example of unusual accuracy. Up until this particular action, the usual practice amongst PBY crews was to attack submarines across their length at an angle, dropping the depth charges in a stick. This allowed the pilot a larger degree of aiming error, but resulted in at least half the number of depth charges falling beyond lethal range of the target. However, Millard had chosen to attack U-408 along its length, releasing his depth charges in salvo so as to maximise their destructive power. It was a method that demanded exceptional precision, and allowed virtually no margin for error.

The four depth charges were seen to fall on, and to port of, the U-boat's stern, and any one of these would probably have ruptured the boat's pressure hull. Had Lt Millard stood on the U-boat's deck and rolled his depth charges over its side, he could hardly have placed them more accurately! It was indeed a superb attack, for which Bob Millard received the Distinguished Flying Cross and his crew the Air Medal.

Lt Millard's destruction of U-408 on 5 November would prove to be the squadron's last contact with the enemy during the month.

On 8 November, Allied troops stormed the Vichy French-controlled beaches of Morocco and Algiers as part of the *Torch* landings. When the enemy realised that the Allies had launched an invasion of North Africa, a large part of the U-boat fleet was redeployed off local ports, thus briefly clearing the northern convoy route of the submarine menace.

BLOODY WINTER

Iceland is the place where pilots take their graduate course in bad weather flying, and the curriculum is tough. In the late autumn the North Atlantic starts brewing a chain of howling storms which, during the next several months, sweep the region one after the other. Throughout the winter and early spring of 1943, the customarily stormy North Atlantic exceeded itself in the tempestuous weather it produced. Storm followed storm, creating towering seas which sometimes overwhelmed merchant ships and broke them in half with their violence. The air escort also suffered, and casualties rose as aircraft failed to return from patrols, or crashed on landing in heavy winds and low visibility. In the heat of war nature showed no favourites.

On 27 December 1942, five of VP-84's PBYs were scheduled to carry out an anti-submarine sweep south of Iceland ahead of the track of

A wintery scene familiar to crews serving at any of PatWing 7's bases in Newfoundland, Greenland and Iceland, this photograph was taken at Camp 'Kwitcherbelliakin'. The prefabricated 16-ft x 36-ft Quonset huts were so named because NAS Quonset Point, Rhode Island, was the first air station to receive them (*NARA 80-G-320043*)

eastbound convoy SC 113. The latter consisted of 58 merchantmen bound for England, these vessels being heavily laden with fuel, munitions and food. It was a moonlit night, with $^{5}/_{10}$ths overcast and frequent heavy snow squalls blowing across the area just as the first PBYs took off.

BuNo 04402/5, flown by Lt Harvey Hill Luce, was the third aircraft to take-off, and it had been airborne only 18 minutes when the PBY crashed into a lava field near the Army Air Force base under construction at Keflavik. The PBY exploded on impact with the ground and burst into flames, killing all on board – three officers and five enlisted men. The accident was a blow to squadron morale, for Hill Luce, besides being a highly respected aviator, was a popular squadron officer.

To avoid the violent winter storms, most convoys crossing the Atlantic at this time were routed south of the Iceland area through calmer waters. This is where some of the fiercest convoy battles of the war took place in the 'Bloody Winter' of 1943. Hence, VP-84 had few opportunities to engage the enemy during this period. Indeed, except for the damaging of U-631 by Lt James T Hogan in BuNo 2461/3 on 17 January 1943, the unit failed to make contact with the enemy until 5 April, when Lt(jg) Lowell L Davis in BuNo 2461/3 attacked U-592. The damage caused by his depth charges forced the U-boat to abort its patrol several days later on account of badly holed fuel bunkers.

As air patrols extended farther into the Atlantic, and convoys enjoyed air cover over a greater part of their passage, the U-boats found it increasingly difficult to pursue their prey on the surface. Every time an aircraft was spotted, submarine commanders instinctively dived, which in turn meant that the vessels fell hopelessly behind the convoys that they were meant to attack. In early April several U-boat crews reported that they had successfully fought off aircraft while remaining surfaced.

These engagements, and other similar experiences, eventually led to the adoption of 'fight-back' tactics, where U-boat commanders were encouraged to remain on the surface and fight it out with the aircraft whenever it appeared that a safe depth could not be reached before the aeroplane delivered its attack. To meet this new challenge U-boats were soon equipped with increased anti-aircraft armament, and before long they were locked in deadly gun duels with the aircraft hunting them.

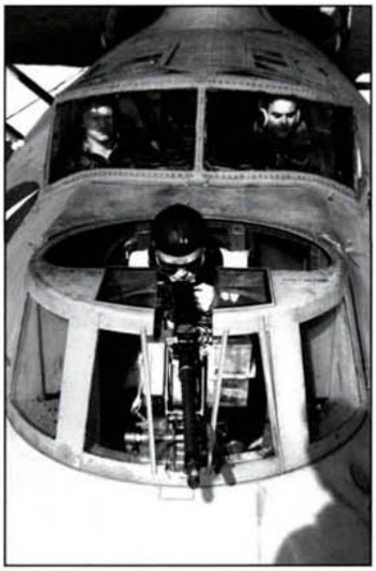
The weather posed a constant threat to aircrew flying from the North Atlantic bases. On 27 December 1942, Lt Harvey Hill Luce's PBY-5A BuNo 04402/5 from VP-84 crashed near Meeks Field (Keflavik) after entering a snow squall shortly after taking off on patrol from Reykjavik. The aeroplane exploded upon impact with the ground and burst into flames, killing all on board – three officers and five enlisted men (*NARA 80-G-27561*)

The PBY was a fine patrol aeroplane, but for this kind of warfare it was wholly unsuited. Besides presenting a large, slow-moving target for the U-boat gun crews, the PBY was woefully lacking in firepower. Indeed, its forward-firing armament resembled something out of World War 1 – a single swivel-mounted 0.30-cal 'peashooter' stowed in the bow. It required the removal of the gunner's hatch cover before it could be laboriously pushed into place, sending blasts of cold air through the cockpit. If the bow gunner succeeded in unlimbering his gun without having the hatch cover fly into the windshield or propellers, he faced the danger of being knocked senseless as he thrust his head into a slipstream made fiercer by a diving attack.

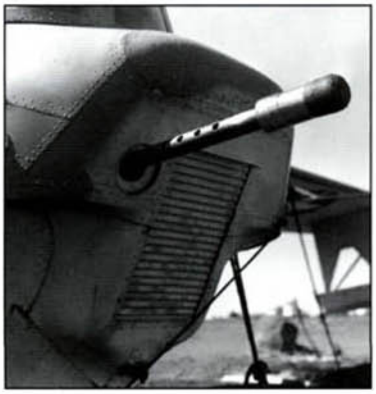
To overcome this obvious flaw in the PBY's fighting ability, VP-84 experimented with a single forward-firing fixed 0.50-cal machine gun installed in the bow. Although successfully ground-tested, the weapon was replaced by a smaller 0.30-cal machine gun which was considered to be a superior anti-personnel weapon due to its higher rate of fire.

The effectiveness of the 0.30-cal fixed machine gun against U-boat flak battery crews was demonstrated on several occasions, but its use produced one serious snag – it upset bomb-aiming if used during the final stage of an attack run. This was especially true if the attack was made with the wind blowing across the PBY's line of attack during the bomb run. On several occasions, when the pilot's attention was focused on firing the gun rather than lining up for his attack run, the aeroplane drifted away from its target, upsetting the fall of the depth charges.

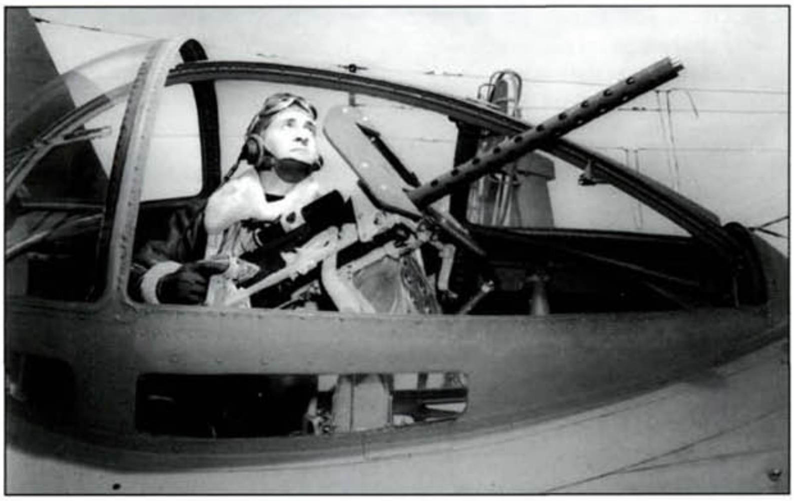
Experiments were also made with a fixed 20 mm cannon in the PBY's bow. The gun and mounts were obtained for a case or two of beer from the local USAAF unit, which operated similarly-equipped Lockheed P-38 Lightnings. Bob Millard's Crew Chief, Machinist's Mate John Vasu, was responsible



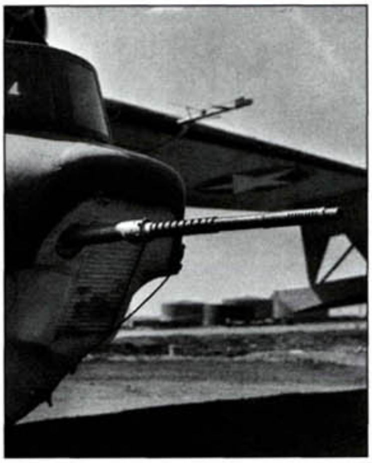
The single swivel-mounted 0.30-cal machine gun mounted in the PBY's bow looked more like something out of World War 1 than a contemporary weapon of the early 1940s. It was certainly no match for the U-boats' 20 mm and 37 mm anti-aircraft cannon. Additionally, the gunner's exposed position made the gun difficult to aim when the former was thrust against the hatch by the 180-knot wind rushing over the bow during a high-speed diving attack (*NARA 80-G-13735*)



VP-84 conducted experiments with a variety of bow gun installations, including this fixed 0.50-cal machine gun that protruded through a hole in the nose. It was ultimately rejected, however, in favour of the smaller 0.30-cal machine gun, which was considered more effective as an anti-personnel weapon because of its higher rate of fire. In the spring of 1943, all of VP-84's PBYs were fitted with the 0.30-cal fixed gun installation as shown here (*NARA 80-G-81180*)



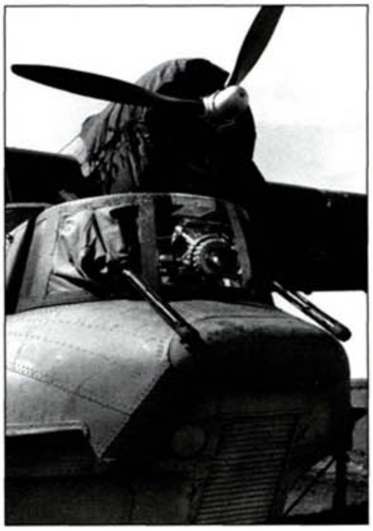
The PBY also had single 0.50-cal machine guns in each waist blister position for self-defence against attack from the air. The fan of an air driven generator used for target towing can been seen beyond the blister, suggesting that this particular PBY belongs to a utility unit (*NARA 80-G-13725*)



VP-84 also experimented with a fixed 20 mm cannon acquired from a USAAF P-38 squadron based at Reykjavik in return for a case or two of beer. This weapon was reportedly installed in two of the squadron's PBYs, but it malfunctioned the only time it was fired in anger (*NARA 80-G-81177*)

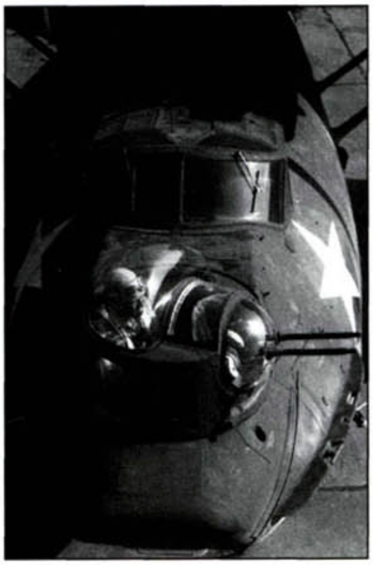
for the installation which found its way into at least two of VP-84's PBY-5As. The cannon, which suffered much the same deficiencies in operation as other fixed gun installations in the PBY, was only once fired in anger – a lack of knowledge in its operation supposedly caused it to jam!

CAP Arthur Waine Lewis, who was yet another member of Bob Millard's ingenious crew, had been a metalsmith before receiving his wings. His idea for better nose armament took the form of a twin 0.50-cal bow turret. The prototype was fitted to Millard's aeroplane and flight tested, with the results being favourable except for the fact that the turret's weight made it difficult to swing manually. A short while later Lewis was transferred to the Atlantic Fleet's Aircraft Antisubmarine Development Unit in Quonset Point, where he continued work on his design, adapting it for hydraulic control.



The most ambitious of VP-84's bow gun experiments was the twin 0.50-cal flexible mounting designed and built by CAP Arthur Waine Lewis in June 1943 – at least two squadron aircraft received Lewis' turret. The guns proved heavy to handle manually, and when Lewis returned home, he continued his work on the weapon, adapting it for hydraulic control. Note the front end of a flat-nosed Torpex depth charge under the port wing (*NARA 80-G-81169*)

A dozen or so units were duly built for US Coast Guard-manned PBY-5A squadron VP-6(CG), based in Greenland, but by this time PBYs coming off Consolidated's assembly line boasted twin flexible 0.30-cal weapons housed in an eyeball turret as the PBY's standard bow gun mount. Interestingly, in 1944 the Air Force Atlantic Fleet ordered that all PBY-5A twin 0.30-cal turrets be replaced by hydraulically-operated twin 0.50-cal turrets manufactured by the Naval Gun Factory in Washington, D.C.



A detailed view of the twin 0.30-cal 'bug-eye' bow turret fitted to late model PBYs, which replaced the earlier single 0.30-cal turret. This particular turret is the standard early 'bug-eye', complete with the clear protective dome for the gunner's head. This dome was prone to crazing and cracking, so it was often removed in the frontline and replaced with a solid metal cover that still provided room for the gunner's 'noggin'. If the aeroplane was unlikely to need any armament, the dome was replaced with a flat, hinged metal panel. By the time the PBY-6A entered production, the clear bubble had been replaced by the bulged metal fitting (*San Diego Aerospace Museum Collection*)

Gun mounts were not the only improvements made to the PBY's offensive capabilities in the spring of 1943. A more powerful explosive known as Torpex – a lethal mixture of Cyclonite, TNT and aluminium flakes – was introduced in depth charge form in early 1943, appreciably increasing the weapon's lethal radius. Finally, a formidable new weapon developed in absolute secrecy by US Navy scientists came into service at this time – the airborne acoustic homing torpedo.

Officially known by the cover-name 'Mk 24 Mine', it was referred to more familiarly by its American users as 'Fido'. This deadly weapon was designed to home in on the propeller cavitations of a submerging U-boat, and to conceal its existence from the enemy, aircrew were under strict orders not to employ the torpedo until after the vessel had submerged.

On 11 May 1943 VP-84 missed the chance of becoming the first unit to sink a U-boat with 'Fido'. Four of the squadron's PBYs were sweeping the track of convoy ON 182 southwest of Iceland when Lt(jg) Eugene B Slocum in BuNo 2459/7 attacked a U-boat (presumably U-731) with the secret weapon. The torpedo hung, however, only to fall harmlessly into the water a few minutes later. Hence, the distinction of scoring the first success with the self-homing guided missile went to a British Liberator of No 86 Sqn the following day.

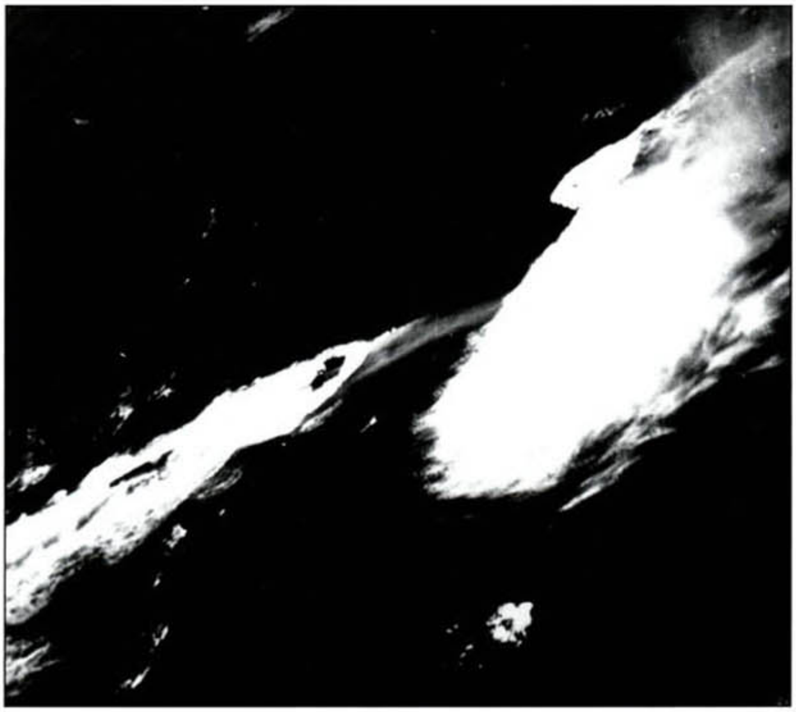
Despite its age, the PBY had improved its punch. And although its days in the Atlantic were numbered, they were by no means over.

TRIUMPH OVER THE 'WOLFPACKS'

As the the weather improved, convoys were routed north again, where they could be afforded air coverage over a greater part of the transatlantic passage. During April 1943, VP-84 delivered seven attacks on enemy vessels, resulting in two U-boats having to abort their patrols and head for port. One was U-592, mentioned earlier, and the other was U-528, which was heavily damaged by Lt(jg) William A Shevlin in BuNo 2459/7 on 28 April. The submarine probably escaped destruction only because Shevlin's aim had been upset while firing his 0.30-cal fixed bow gun during the bomb run. U-528's luck ran out while returning to port, however, as it was sunk by British air and naval forces in the Bay of Biscay.

During the month of May the number of attacks increased to 12, with two of the targets being sunk with all hands. The first victim was U-640 (commanded by Oberleutnant Karl-Heinz Nagel), which was sunk southwest of Iceland on 14 May by Lt(jg) Phillip A Bodinet in BuNo 2457/11 after having been chased off the westbound convoy ONS 7 by Lt Everett W Wood the previous evening. Eleven days later Lt Robert C Millard, in BuNo 2467/6, added a second U-boat to his score by sinking U-467 (commanded by Kapitänleutnant Heinz Kummer) with a 'Fido'.

As May drew to a close, Adm Dönitz bowed at last to the inevitable and withdrew his U-boats from the North Atlantic, albeit only temporarily. His losses in May had reached an intolerable level, with twice as many submarines having been lost in the first three weeks of the month than had been sunk in any other full month



This photograph was taken during Lt(jg) William A Shevlin's attack on U-528 in VP-84's BuNo 2459/7 on 28 April 1943. The U-boat's conning tower and stern are still visible as the depth charges explode slightly ahead of its position. Had Shevlin not made a last-minute drift correction, the depth charges would probably have straddled the target. Nevertheless, U-528 suffered heavy damage from the attack which forced the submarine to abandon its patrol. While returning to port, it was sunk in the Bay of Biscay by British air and naval forces (*US Navy via William A Shevlin*)

of the year to date. Nearly two-thirds of these losses Dönitz attributed to 'the increased use of land-based aircraft and aircraft carriers'.

He insisted that the withdrawal was only temporary to prevent unnecessary losses, and five months later he did indeed renew the campaign on the North Atlantic convoy routes. But never again did the battle reach the same intensity, nor hang so delicately in the balance, as it had in the fateful spring of 1943. After 45 months of unceasing battle, the air and surface escorts were achieving the success that they deserved.

In March 1943 the Allies reached an agreement that saw the US Navy withdraw from convoy escort responsibilities in the North Atlantic and take over the escorting of new Central Atlantic convoy routes from the East Coast and Caribbean to the Mediterranean. It was also tasked with protecting tanker convoys sailing from the Caribbean to the British Isles.

As part of these changes, British and Canadian forces were given full responsibility for protecting the North Atlantic convoy routes, except for the Greenland convoys and local Greenland-Labrador shipping, which remained an American responsibility vested in the US Coast Guard. US escort forces gradually withdrew from the North Atlantic during 1943, and before long the Iceland Air Group followed, but not before VP-84 had added two more U-boats to its tally, and should have claimed a third.

On 8 June 1943, Lt Robert C Millard let slip the chance to become the leading anti-submarine warfare pilot of the war when he failed to sink U-535 after it had been attacked and left unable to dive by a British Hudson. Although this decision would rob him of the chance to add a third U-boat to his score, Millard's decision to wait for surface ships to join the fight is justifiable in light of the fact that the vessel was evidently unable to dive, thus making its capture by surface forces highly likely.

Half-an-hour of playing 'cat-and-mouse' with the U-boat's flak gunners passed while the weather deteriorated and low scattered clouds started setting in around them. Finally deciding that this was too good a chance to let pass, Millard climbed above the cloud, hoping to surprise the enemy by attacking it through the broken overcast. However, the U-boat's commander was nobody's fool, and he correctly predicted Millard's move, turned his boat around, and sped in the opposite direction towards a fog bank that was closing in on the area! Before Millard could deliver his attack, U-535 made good its escape, swallowed up by the dense fog.

In almost impossible weather, with a cloud base at only 75 ft and visibility less than 200 ft, Millard searched in vain for the U-boat that had so cunningly outsmarted him. Sorely disappointed, he was eventually forced to return to base.

On 20 June three PBY-5As of VP-84 were sweeping the track of convoy ON 189 southwest of Ice-

'Woodie' Wood and Gene Allen pose with their commanding officer and other ranking officers of NAF Iceland after receiving the British DFC during a ceremony on 28 August 1943. They are, from left to right, Lt(jg) Eugene T Allen, Lt Everett W Wood, Lt Cdr Poyntell C Staley (CO of VP-84), Flight Surgeon Cdr L H Goldsmith and Lt Cdr Warren R Thompson, Commander NAF Iceland. Cdr Goldsmith happened to be a passenger on the flight with 'Woodie' when he sank U-388 on 20 June 1943 (*NARA 80-G-78867*)

land when Lt Everett W 'Woodie' Wood in BuNo 08037/9 attacked and sank U-388 with all hands. Four days later, Lt(jg) Joseph W Beach in BuNo 2459/7 added another submarine to the squadron's tally when he sank U-194 southwest of Iceland. This was the third U-boat to fall victim to BuNo 2459, thus making it the most successful Allied anti-submarine warfare aircraft in World War 2 in terms of vessels sunk.

Of this and other losses suffered in June 1943, Adm Godt wrote in U-boat Command's War Diary on the last day of that month;

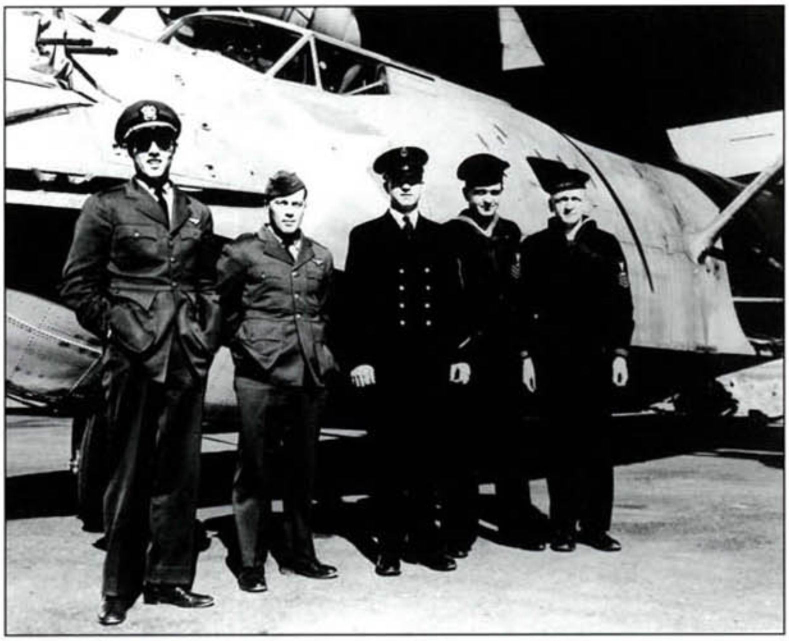
'Because of the loss of U-194 and U-200, as well as previous experiences, the Commander-in-Chief has ordered, with immediate effect, that no U-boat is to put out without quadruple-mounted guns. A postponement of operational orders for three to four weeks and a hold up in German shipyards must be reckoned with.'

Even if this order affected only the new U-boats leaving home waters and not those sailing from the French Biscay ports, its impact on the number of vessels available for operations was huge. Within a week only one U-boat was left in the North Atlantic, and by mid July not a single submarine was operating between Newfoundland and the British Isles.

VP-84's Lt (jg) Joe Beach was destined never to know this fact, however, for five months later he was killed when his PBY-5A (BuNo 7261) crashed shortly after taking off from Beaufort, in South Carolina.

The role played by the PBY in the Battle of the North Atlantic came to an end in June 1943, by which time Allied air and surface forces had virtually cleared the area of the U-boat menace. Three months later VP-84 returned home, where many of its aircrew transferred to other commands. After two brief tours of duty on the East Coast, VP-84 moved to Coco Solo, where it patrolled the approaches to the Panama Canal and shipping lanes off the Spanish Main. Then, in April 1945, the unit was ordered to Alameda and FAW 8, thus returning to the command under which it had been established in 1941. VP-84's final duty was to cover the approaches to San Francisco during the United Nations' inaugural conference. When this ended, VP-84 disestablished on 28 June 1945.

Lt Everett W 'Woodie' Wood (right) poses with his co-pilot, Ens Orville 'Sig' Sigurdsson, in front of their Quonset hut soon after sinking U-388 (*Courtesy of Nunna Wood*)



Lt(jg) Joseph Beach (far left) and members of his crew pose beside PBY-5A BuNo 2457/11 at Reykjavik in the summer of 1943. Note the aircraft's experimental twin 0.50-cal flexible bow turret (*Courtesy Joseph Beach Peters*)

SOUTH ATLANTIC

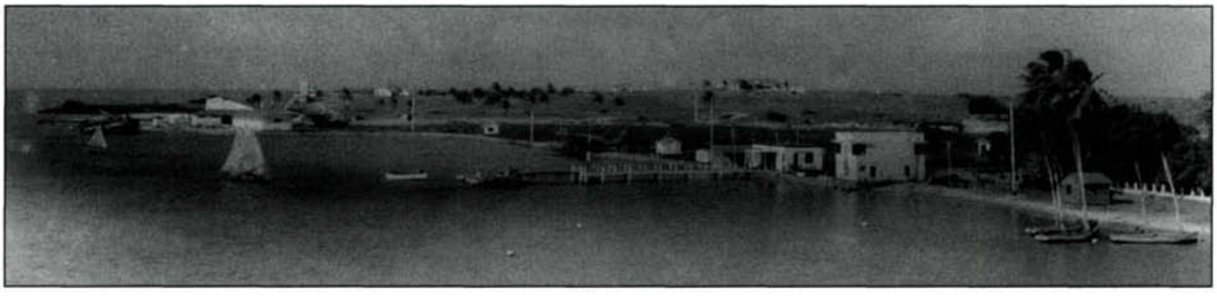
Long before the attack on Pearl Harbor, both military and political leaders in the USA were fully aware of the importance of the South Atlantic, and Brazil in particular, to the defence of the western hemisphere. If the Americas were to be invaded by the Axis powers, it would be via the Atlantic at its narrowest point – the Atlantic Narrows between French West Africa and Brazil. Even though Berlin had no such plan, anything seemed conceivable at the time, and with the fall of France in June 1940 and the establishment of the Vichy government in the south of the country and in French territories in West Africa, the possibility of this happening seemed highly likely.

In Brazil, the United States had extended generous credits in return for the construction of air bases from Belém to Bahia (in Salvador). These were to be made available to US armed forces in an emergency, but not until November 1941 was permission granted by the Brazilians for the permanent basing of US Navy patrol aeroplanes on their soil.

On 7 December 1941, six PBY-5s from VP-52's first division took off from San Juan and Guantanamo Bay with orders to transfer to Natal. It was not until they landed in Trinidad that the crews received news of the Japanese attack on Pearl Harbor. The transfer was then delayed for several days, possibly while the US government secured assurances from their Brazilian counterparts that the PBY crews would not be interned upon their arrival in Natal, since Brazil was still a neutral country.

Whatever the reason for the delay, the PBYs departed Trinidad on the 10th, and after refuelling from the small seaplane tender USS *Thrush* (AVP-3) in Pará (Belém), they arrived at Natal's seaplane anchorage on the Potengi River the following day. Here was a seaplane base already in existence, being operated by Pan American Airways and its subsidiary, Panair do Brasil, and considered far superior to anything else noted in Central or South America. And with the acquisition of facilities abandoned earlier by the German-controlled Syndicato Condor Ltda as living quarters, the Brazilian air detachment was certainly far better off than its counterpart at Camp 'SNAFU' in Iceland.

With the arrival in Natal of *Thrush* from Belém, operational flying commenced on 19 December. Armed with two 250-lb General Purpose bombs, two PBYs were assigned daily sea patrols or convoy duty while another two stood by as a striking force. Meanwhile, the division's



The US Navy seaplane base in Natal, Brazil, was located just above the mouth of the Potengi River, and within walking distance of the city itself. Here, a PBY-5 of VP-52 is seen being either launched or beached, with two others on the beach itself. The pre-war facilities of the German-controlled Syndicato Condor Ltda can be seen in the distance, while those closer were operated by Pan American Airways and its subsidiary, Panair do Brasil, and are still in existence today (*NARA 80-G-10667*)

remaining two aeroplanes would be undergoing routine maintenance, or running the mail between Natal and Recife, 200 miles to the south.

During the first half of 1942 the Germans were too busy running their campaigns off the US East Coast and in the Caribbean to send U-boats into the South Atlantic. Hence, VP-52 failed to make contact with the enemy during its four-month deployment in Brazil. However, an Axis presence was starting to be felt just as the detachment readied to leave.

In April the Italian submarine *Calvi* sank three merchantmen off Brazil's north coast. The first of these was the US tanker SS *Eugene V R Thayer*, which was shelled and set alight 120 miles northwest off Fortaleza during the night of 8/9 April. The following day two PBYs from VP-52 sighted the sinking ship, and Lt(jg) Mark M Bolin made an open-sea landing and rescued 13 survivors from one of the vessel's lifeboats.

9 April had also seen six PBY-5A amphibians of VP-83's first division arrive in Natal to relieve VP-52, and they soon commenced operational flying from the recently completed Parnarmarim airfield eight miles southwest of the city. Two weeks later VP-52 flew its last sortie in-theatre and then bid farewell to Natal. In the four months that its six PBYs had been deployed in Brazil, they had made 258 operational flights without incident, and never missed a day of flying. That, of course, was due in no small part to the excellent flying weather in Natal – in stark contrast to Iceland, where the Fleet Air Detachment had been forced to cancel flying on 33 days during the same period on account of bad weather!

VP-83 did not have long to wait before encountering the enemy. Several Italian submarines were operating north of Brazil, and on 23 May Lt(jg) Allan R Waggoner in BuNo 7263/2 became the first US Navy pilot to attack an enemy submarine in the South Atlantic when he made an unsuccessful pass on the Italian vessel *Archimede* 220 miles northeast of Fortaleza. Although the attack was made in conjunction with a Curtiss SOC Seagull floatplane launched from the cruiser USS *Milwaukee* (CL-5), *Archimede* escaped unscathed, but its luck would soon run out.

On 8 June VP-83's second division left Norfolk to reunite with the rest of the unit in Natal. Since April, it had had detachments operating along the US East Coast from Norfolk to Banana River, in Florida.

The PBYs were on their final leg of the flight to Natal when tragedy struck. Lt(jg) Chester H Skidmore in BuNo 7252/12 encountered a severe thunderstorm as he approached the base during the early evening and crashed into the sea five miles short of Natal Light. Seven of the ten-man crew perished. At first light all of VP-83's PBYs took off to search for the aircraft, its wreckage being located by Lt(jg) Cooper, who circled the scene while the survivors were taken aboard a Brazilian fishing boat.

THE ENEMY STRIKES

In July 1942 a German plan to send ten U-boats to Brazil was called off because of the adverse effect it might have on pro-Axis countries such as Argentina and Chile should their shipping be affected. However, the captain of U-507, which was operating in the eastern part of the South Atlantic, requested authority to enter Brazilian waters when he found no targets in his assigned patrol area off Freetown, in Sierra Leone.

Although the earlier plan to launch open warfare with Brazil had been abandoned, Berlin did not object to a single-boat foray, and on 8 August

U-507 was given a free hand off the Brazilian coast. Reaching local waters on the 15th, it sank five Brazilian merchantmen in two days, with heavy loss of life, all within 100 miles of the coast between Recife and Salvador. One of the vessels, the troopship *Baependy*, went down with 228 Brazilian soldiers and 56 crew, along with two artillery batteries, aboard. Both the Brazilian Army and the general public demanded revenge, and on 22 August 1942 Brazil declared war on the Axis powers.

U-507 crash-dived on numerous occasions during this period when sighting aircraft, and it successfully avoided detection every time bar once – on the 18th it was caught on the surface 60 miles from the coast by Lt(jg) John M Lacey in VP-83's BuNo 2479/6. Lt(jg) Lacey swept over the fully surfaced U-boat, firing his guns and releasing four depth charges in a badly aimed drop that struck the water some 600 ft off the boat's starboard bow and inflicted no damage at all on the enemy.

The following day U-507 added a small Brazilian schooner to its tally and then a Swedish freighter on the 22nd, before heading home. The vessel's luck would run out on its next war cruise to the South Atlantic, however, as it would be sunk with all hands by a PBY-5A from VP-83.

December 1942 turned out to be a busy month for VP-83, with a total of 183 sorties being flown for an operational total of 1600 hours. In late November, a patrol line of eight U-boats had been established extending northeastwards from Fortaleza. These vessels had been given the job of intercepting merchant traffic crossing the South Atlantic to Cape Town, in South Africa, and beyond. The U-boats met with considerable success, sinking 12 ships totalling 61,000 tons in just one month, to which the Italian submarine *Tazzoli* added two more, weighing 9800 tons.

In five days between 13 and 17 December, the PBY-5As of VP-83 delivered attacks on four of the U-boats. The first of these, U-126, escaped damage on 13 December, despite Lt(jg) Gerard Bradford Jnr in BuNo 2472/5 reporting that his bombs had been well aimed. Not so the other three, all of which were to suffer varying degrees of damage. The first was U-174, attacked by Lt William L Wall in BuNo 08039/12 170 miles east-northeast of Natal. The depth charges struck the water 20-30 metres off the U-boat's port side and parallel to the hull. Badly shaken, U-174 escaped the attack with multiple equipment failures and damages.

Four hours later VP-83's Executive Officer, Lt Cdr Bertram J Prueher, came across U-161 100 miles east-northeast of Natal while carrying out an anti-submarine sweep in BuNo 2480/7. Attacking from the vessel's starboard bow, he dropped four depth charges from a height of 100 ft 23 seconds after the U-boat had submerged. Their detonation pattern straddled the vessel's track, with two exploding on either side of the hull.

The war diary of U-161 reveals that it narrowly escaped destruction during Prueher's attack. After sighting the approaching aircraft, the submarine crash-dived, but the vessel's commander did not descend too deeply for he believed that U-161 had not been spotted by the PBY. However, four shallow-set depth charges dropped by Prueher exploded directly over the U-boat, which was just 35 metres below the surface of the water. Suffering substantial damage in the attack, U-161 was eventually forced to cut short its patrol and return to port for repairs.

The following morning Lt Frederick C Andretta in BuNo 2484/9 sighted U-161 limping northward and dropped a single depth charge on it nearly one minute after the vessel had crash-dived. It was a hopeless attack, which he said he did to coax the U-boat to the surface by making the enemy think that all his bombs had been expended. U-161's crew was not to be fooled that easily, however, and they remained submerged for the rest of the day after only hearing the explosion of a single bomb.

The last submarine to be attacked by VP-83 in December was U-176 on the 17th, Lt(jg) Gerard Bradford Jnr in BuNo 2472/5 dropping three depth charges on the U-boat. The vessel had only reached a depth of 20 metres when the bombs exploded, inflicting moderate damage and forcing the U-boat to withdraw seawards to carry out repairs. VP-83 was honing its skills, and it would not have long to wait before making a kill.

On 24 December U-507 (commanded by Korvettenkäpitan Harro Schacht) and U-164 (commanded by Korvettenkäpitan Otto Fechner), which had only just been added to the group operating northeast of Natal, received orders to move inshore to target coastal traffic, whence they became VP-83's first two victims.

U-164 was the first to be sunk. It had celebrated New Year's Day by sinking the 2600-ton Swedish vessel MS *Brageland*, which was carrying wool, coffee, cheese and mail from Santos, in Brazil, to Philadelphia. Five days later, while 65 miles off Brazil's north coast, the U-boat was caught unawares by Lt(jg) William R Ford in BuNo 7263/2. The PBY was returning to Natal after covering Rio de Janeiro–Trinidad convoy JT 1.

First to sight the enemy was AMM3c Billie Goodell from the port waist blister. Upon spotting the submarine himself, Bill Ford went into a power-off glide in order to keep a small cloud between the PBY and the U-boat, before boring down on his prey at full power. He manually released four 325-lb Mk 17 depth charges from 35 ft as the aeroplane swept across the submarine from the starboard bow at 225 knots – well in excess of its maximum speed! U-164 was lifted out of the water by the explosion of the bombs, and appeared to break in two, leaving three torpedo canisters, miscellaneous debris and two men in the water.

The U-boat's two survivors had been relieved of their bridge watch shortly before the attack, and had come up on deck to wash. Upon sighting the aeroplane, the boat crash-dived, but by the time the two men had climbed back into the conning tower, the hatch had been closed on them and they were hurled into the water by the force of the exploding depth charges. By the grace of God they were not hit by the PBY's accurate 0.50-cal gunfire, which was being shot off at anything floating on the surface – the PBY crew thought that a third survivor had possibly been killed during one of these strafing runs.

After clinging onto a torpedo canister for more than a hour, both men managed to climb into one of the two rafts dropped to them from the PBY. After spending seven days at sea, they were washed ashore near the town of Cururupu, in the state of Maranhão. The Brazilian police

VP-83's PBY-5A BuNo 2480/83P7 arrives at NAS Natal from São Luís on 23 January 1943 with U-164's only two survivors, Bootsmann Gerhard Schönfelder and Matrosengefreiter Alfred Jädike. Both were bathing on the deck when Lt(jg) William R Ford bore down on their boat, and it was their good luck that the conning tower hatch had closed on them by the time they reached the bridge. Thrown overboard by the explosions of the depth charges, the sailors eventually managed to climb into a life raft dropped to them by the PBY's crew. For seven days they drifted some 380 miles until washed ashore near the town of Cururupu, in the state of Maranhão, where they were cared for by the local inhabitants before being handed over to the police in São Luís. BuNo 2480 transferred to the USAAF in June 1943 and was assigned the Army Air Force serial number 42-109024. It served with XII Fighter Command Catalina Air Sea Rescue Detachment and later the 1st Emergency Rescue Squadron in the Mediterranean until condemned in November 1944 (*NARA 80-G-60069*)

soon took them into custody, before turning them over to the US Navy. When questioned, the men insisted that they had been the only survivors of the attack, and this information must have come as a relief to Bill Ford and his crew, who had an awful sense of guilt hanging over them that they might have killed a defenceless survivor in the water.

U-507 lasted a week longer than U-164. In the two weeks between 27 December and 8 January, it had sunk three merchantmen, totalling 14,000 tons, north of Fortaleza. Just after sunrise on 13 January 1943, U-507 reported sighting a convoy 170 miles north-northwest of Fortaleza. Nothing more was heard from the vessel because 46 minutes later it was attacked by Lt(jg) Lloyd Ludwig in PBY '83P10' (probably BuNo 08099) and lost with all hands.

Lt(jg) Ludwig and his crew had departed Fortaleza at 0500 hrs in order to cover the eastbound Trinidad–Recife convoy TR 1. The latter was passing north of Fortaleza when a submarine was sighted by Ludwig's co-pilot, Lt(jg) Mearl G Taylor, 20 miles astern and on the same heading as the convoy they had been tasked with protecting. Ludwig concealed his approach by closing in on his target from out of the sun for a head-on attack, manually releasing four depth charges from a height of 40 ft some 200 ft ahead of the U-boat's conning tower. The bombs appeared to straddle the vessel's path as it disappeared under the surface. The only evidence of possible damage to the submarine was an oil slick that bubbled up several minutes after the depth charges had exploded.

While it appeared that the attack had been delivered accurately, without hard evidence to prove the vessel's demise, Ludwig and his crew had to wait until after VE-Day to be credited with the sinking of U-507.

With the increased U-boat activity in Brazilian waters, VP-74 was immediately ordered to head to Natal from Trinidad. Arriving in Brazil on 18 December 1942, the unit quickly enjoyed success despite operating unreliable PBM-3Cs. VP-74 sank three U-boats and shared in the destruction of a fourth, before being detached in October 1943.

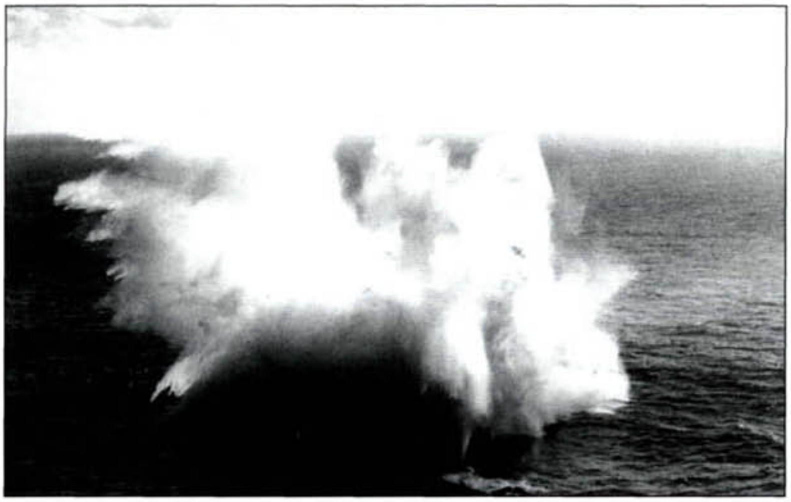
A month after VP-74 arrived in Brazil, VP-94 transferred its 11 PBY-5As from the US Eastern Seaboard to Natal's Parnarmarim airfield – the unit's first flying-boats arrived on 18 January 1943.

On 23 April 1943 VP-83 received orders to transfer to Norfolk, where the squadron was to reform and re-equip with the new PB4Y-1 Liberator, but not before it had added a third enemy submarine to its tally.

On 15 April Ens Thurmond E Robertson was returning to base from an anti-blockade-runner barrier patrol in BuNo 2472/5 when the Italian submarine *Archimede* (commanded by Tenente di Vascello Guido Saccardo) was sighted eight miles dead ahead from 7300 ft, 390 miles east-southeast of Natal. As Robertson came closer, he was greeted by a barrage of anti-aircraft fire. Rather than going straight for a low-level attack, the PBY pilot decided to drop two bombs vertically from 6000 ft in the hope that these might clear the submarine's decks.

Before that could be accomplished, however, the vessel crash-dived, so Robertson hurled the PBY into a 60-degree dive. Reaching a speed of 245 knots, he then flattened out at 2000 ft and released four 350-lb Mk 44 Torpex-filled depth charges, which straddled *Archimede's* hull.

Of the various duties the versatile PBY was capable of carrying out, dive-bombing was definitely not one of them, and the chance of hitting a



Diving at an angle of 60 degrees, and reaching a speed of 245 kts (within five knots of the PBY's calculated terminal velocity at 2000 ft), Ens Thurmond Robertson of VP-83 released four depth charges at 2000 ft, damaging the Italian submarine *Archimede* to the extent it was unable to dive. The vessel was finished off one hour and twenty minutes later by Lt Gerard Bradford Jnr in another PBY-5A from the same unit. This action took place on 15 April 1943 some 390 miles off the Brazilian coast (*NARA 80-G-205266*)

moving target in an attack of this kind was next to zero. Yet, to Ens Robertson's surprise, the submarine returned to the surface and started circling erratically to port. Apart from smashing all lighting fixtures and knocking out one of the 1500 hp diesel engines, the bombs had ripped two forward hatches off their hinges, rendering the *Archimede* unable to dive.

For the next 40 minutes other aircraft homed in on the scene, with the first to arrive being Lt Gerard Bradford Jnr in VP-83's BuNo 08039/12. He lost no time in diving on the *Archimede* in the face of heavy flak, dropping four Mk 44 depth charges from an altitude of 50 ft with stunning accuracy. One of the bombs tore through the aft hatchway, exploding four primed torpedoes in the stern tubes and blowing a tremendous hole in the pressure hull. The submarine sank stern first, leaving 25 men in the water, including *Archimede's* commanding officer.

Six of the survivors were badly wounded and did not last long, but 19 managed to get into two of the three life rafts dropped by the two PBYs circling above. As the days passed, one after the other they succumbed from their wounds, starvation or drinking sea water, until only one was left – 26-year-old Sicilian coxswain Giuseppe Lococo.

After surviving an unimaginable 29-day ordeal at sea without food or water, he was washed ashore on the island of Bailique at the mouth of the Amazon River after drifting 1400 miles. Here, he was found barely alive by two fishermen, and he eventually recovered to tell his story.

After turning three of its PBY-5As over to VP-94, the last of VP-83's flying-boats left Natal for Norfolk on 10 May. Five days later the unit reformed as VB-107 with the PB4Y-1 (B-24) Liberator. The squadron returned to Brazil in June, adding five more U-boats to its tally to make it the Navy's top-scoring anti-submarine patrol bombing squadron of World War 2, with a total of eight submarines sunk to its credit.

The defeat and forced withdrawal of the U-boats in the North Atlantic in May 1943 created an increased number of vessels which now became available for operations in more distant, and presumably less well defended, waters. In May and June ten U-boats sailed for Brazil in what became known as the July Blitz. From the border with French Guiana in the north to Rio de Janeiro in the south, there assembled the largest concentration of U-boats hereto encountered, which in the space of just six weeks accounted for 19 ships totalling 105,000 tons.

But this success came at a terrible cost to the U-boats involved, for only two of the ten vessels would return from their patrols. Of the eight boats lost, seven were sunk by aircraft operating from Brazil, including two by PBY-5As of VP-94 and one by a PBY-5 of the *Força Aérea Brasileira*.

In anticipation of the U-boat blitz that was about to descend on it, the recently enlarged VP-94 (which had boosted its strength from 12 to 15 PBY-5As) detached six of its flying-boats to Belém on 18 June and four to

Rio de Janeiro one week later. It was a wise move, for in the space of only two weeks, the unit's PBYs would carry out seven attacks, sinking U-590 (commanded by Oberleutnant Werner Krüer) and U-662 (commanded by Kapitänleutnant Heinz-Eberhard Müller) off Brazil's north coast.

On 9 July 1943, Lt(jg) Frank F Hare in '94-P-10' (almost certainly BuNo 05032) was sweeping an area east of the Trinidad-Rio de Janeiro convoy TJ 1 when he spotted U-590 just 12 miles away. By the time the U-boat's lookouts saw the PBY, it was too late to dive. Instead, the vessel opened fire on the aircraft with its anti-aircraft guns. A shell entered the aeroplane's bow and exploded against the instrument panel, killing Frank Hare, wounding his radioman and starting a fire in the cockpit.

At just 100 ft above the wave tops, Hare's co-pilot, Lt(jg) Jean P Phelps, grabbed the controls and finished the bomb run, releasing two of the PBY's four Mk 44 depth charges that overshot the target and inflicted no damage. As Phelps turned around to drop the two remaining bombs that had hung from the first run, the crew discovered that the bomb release cable for these weapons had been shot through, so the run was aborted.

With all flight instruments except the altimeter and the ball of the turn-and-bank indicator inoperative, Phelps, himself wounded by grazing shrapnel fragments, homed other aeroplanes in the area to the scene, before pointing his crippled PBY in the direction of Belém, some 350 miles away. Phelps successfully made it back to base.

Shortly before Hare's sighting, Lt(jg) Stanley E Auslander in BuNo 02955/1 had relieved '94-P-7' on station over convoy TJ 1, and he was checking out a previously reported periscope sighting when he picked up '94-P-10's' signal and set course for the scene of that action. A triangular gambit course was initiated, with the aeroplane climbing to 4000 ft for cloud cover. On the third leg of the gambit search, the enemy vessel was sighted at a range of just three miles, 40 miles astern the convoy.

On U-590's bridge, the lookouts were either asleep or looking the other way, for they showed no sign of being aware of the PBY's presence when it swept over them at 200 knots and released four 350-lb Mk 44 Torpex depth charges from a height of 150 ft. They straddled the U-boat and sent it to the bottom, with debris, oil and several men being seen in the water after the attack. Despite life rafts, lifebelts and emergency rations being dropped, there were no survivors from U-590's 45-man crew.

Eleven days later, Lt(jg) Stan Auslander was at it again, although now in BuNo 08099/14. While escorting Trinidad-Rio convoy TJ 2, he bombed and then engaged in an hour-long gun duel with U-662 340 miles north of Belém. His four Mk 44 Torpex depth charges had overshot the target, causing no harm to the vessel. The U-boat remained on the surface fighting it out with the PBY until it ran low on ammunition and dived just as one of TJ 2's surface escorts was closing in on the scene.

The following morning, Lt(jg) Richard H Rowland in BuNo 02954/4 found U-662 370 miles north of Belém and attacked it from astern in the face of heavy flak. Despite the PBY being hit in the wing leading edge, fin and hull, which wounded radioman ARM2c John M Watson, Rowland pressed home his attack and released three Torpex depth charges with uncommon precision from a height of 75 ft. One of the bombs struck the U-boat itself, while the other two exploded directly against the vessel's saddle tanks, lifting it out of the water and breaking the hull in two.

B-14
COVER GIRL

While serving with VP-94 in Brazil, Lt(jg) Stanley E Auslander sank U-590 on 9 July 1943 with PBY-5A BuNo 02955/1. Eleven days later he attacked and carried out an hour's gun duel with U-662 until both ran out of ammunition (the submarine was sunk the following day by another PBY-5A from VP-94). In November 1943 Lt Auslander converted to the PB4Y-1 Liberator, and he is seen here standing to the far left with his crew in front of their new bomber PB4Y-1 *COVER GIRL* (BuNo 38785) of VB-105 at Dunkeswell, in England, in 1944 (*Courtesy of Stanley E Auslander*)

Of the U-boat's five survivors, to whom Rowland dropped life rafts, one soon died while the other four were rescued by the patrol yacht USS *Siren* (PY-13) after spending 16 days at sea. One died on the ship after being rescued, leaving the wounded commander and two seamen as U-662's only survivors.

Except for a *Força Aérea Brasileira* PBY-5 sharing in the destruction of U-199 at the end of the month, U-662 was the last U-boat to be sunk by a Brazilian-based PBY. VP-94 would continue flying convoy coverage, anti-submarine and barrier patrols from airfields along the Brazilian coast, as well as from the island of Fernando de Noronha, which lies 214 miles northeast of Brazil's Cabo de São Roque.

The last contact made by a PBY with the enemy took place on 3 November 1943 when Lt John H Dougherty in '94-P-6' (almost certainly BuNo 04973) attacked U-154 60 miles east-northeast of Fortaleza – the advance base from which he was operating. Although his depth charges did the enemy no harm, a possibly good straddle seems to have been defeated by the middle two depth charges failing to explode. The attack did, nevertheless, drive the U-boat off convoy TJ 12, which it had been stalking for eight hours in order to set up a night attack.

On 10 August 1944 five of VP-94's PBY-5As moved to Santa Cruz to initiate the USBATU (United States Brazilian Aviation Training Unit). Four months later, on 12 December 1944, VP-94 transferred its entire complement of 15 PBY-5As to the *Força Aérea Brasileira* in a formal ceremony in Rio de Janeiro's seaplane base at Galeão. Three days later squadron personnel received orders to return to Norfolk, where the unit was officially disestablished on 22 December 1944.

By the end of 1943, what had started out as a detachment of six PBY-5s two years earlier had grown to eight squadrons with an establishment of 99 aircraft under the control of FAW 16. Consistent with the Navy's policy of replacing PBYs with newer, albeit inferior, PBM-3s and PV-1s, only one of the eight squadrons was PBY-equipped!

Presumably as a result of urgent pleas from the Air Force Atlantic Fleet, PBY-5A-equipped VP-45 was transferred from the Pacific Fleet in 1944. Having recently completed its first tour of operations with FAW 4 in Alaska and the Aleutians, the unit deployed to Belém on 29 April. VP-45 maintained detachments in Amapá and São Luis, as well as on the island of Fernando de Noronha and Ascension, midway between Brazil and Africa. From these locations, the unit's PBY crews flew thousands of boring hours without ever so much as getting a glimpse at the enemy.

On 15 March 1945 the unit relocated to Ipitanga, in Bahia, where it flew routine patrols until orders were received on 22 May 1945 to return to Norfolk. Here, the squadron was disestablished two weeks later, bringing to an end a successful chapter in the PBY's wartime record.

EASTERN ATLANTIC

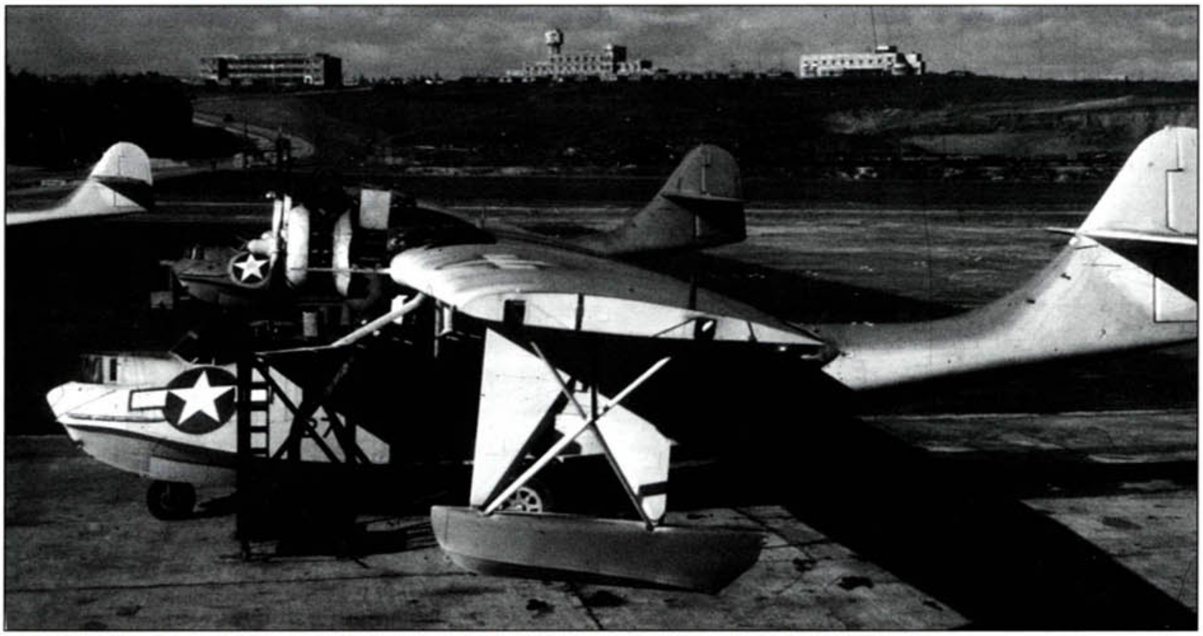
On 8 November 1942, Allied troops stormed the beaches of northwest Africa in an operation code-named *Torch*. Primed, ready and awaiting word that airfields had been secured for their arrival were US Navy patrol squadrons VP-73 and VP-92, both equipped with PBY-5A amphibians. VP-73 had departed Iceland in October and was sitting at RAF Station Lyneham, in Wiltshire, England, waiting for the word to move, while VP-92 had moved from the Caribbean to RAF Station Jui, in Sierra Leone, where it too awaited its orders.

On 12 November both squadrons got the word to move, with VP-92 heading to Cazes Field, in Casablanca, and VP-73 to Craw Field, in Port Lyautey (now Kenitra), both in French Morocco. VP-73's take-off from Lyneham was set for the evening of the 12th in order to cross the Bay of Biscay in the hours of darkness, thus avoiding Luftwaffe fighter patrols.

That evening the ceiling was down to the deck and the runway visibility was a mere six lights. Despite these adverse conditions, and with throttles to the stops, one after the other, 11 PBY-5As departed Lyneham at five-minute intervals for an instrument take-off. Those watching on the ground recalled later that they only knew the aeroplanes were in the air when they heard the engines being throttled back to climb power.

All 11 PBY-5As arrived safely at Port Lyautey the next morning, landing at five-minute intervals. Amazingly, none of the crews had seen each other during the night flight. Within three hours of their arrival

PBY-5As of VP-92 sit on the ramp at Port Lyautey in 1943, the aircraft in the foreground being either BuNo 7254 or its replacement, BuNo 48255 (it is almost certainly the latter). The aircraft parked behind it (BuNo unknown) is apparently one of the PBY-5As that the squadron flew to Casablanca following the *Torch* landings in November 1942, as it wears the early wartime camouflage of Blue Grey over Light Grey and a yellow *Torch* border to its national insignia (*NMUSAF*)



following this outstanding feat of airmanship and navigation, two of the aeroplanes were sent out on patrol. From then on it was business as usual.

Shortly after arriving at Jui, VP-92's first division of six PBY-5As moved to Bathurst, in Gambia, where it spent the night, before continuing to Casablanca on 13 November.

About halfway to Casablanca, Lt(jg) R E Seamans in BuNo 7256/5 sighted a surfaced submarine off the coast of Rio de Oro, near Villa Cisneros (now Dakhlah). He and Lt H S Blake in BuNo 7274/4 circled the vessel in an attempt to establish recognition, but when that failed, Blake made a bombing run, releasing one 325-lb depth charge that exploded under the submarine's starboard side abeam the conning tower, throwing debris into the air. Lt(jg) Seamans followed, dropping two bombs that straddled the vessel amidship. From reports given by the PBYs' crews, the conning tower was blown off the hull and the submarine sank immediately, without any survivors being seen in the water.

Having spent 90 minutes in the vicinity of the submarine, the PBYs were late arriving at Casablanca. In conditions of heavy rain and low visibility, Seamans located the field and landed, but Blake was forced to land in a field six miles from Casablanca just prior to running out of fuel.

The submarine Blake and Seamans attacked was subsequently identified as being the French Vichy vessel *Le Conquérant*. Previously damaged in the Allied bombing of Casablanca harbour (the submarine's commander was also killed at this time), the vessel had set sail to escape further raids, and was probably heading for Vichy-controlled Dakar, in French West Africa, when it was sunk.

Immediately upon their arrival in French Morocco, both units commenced flying patrols off the three beachheads at Casablanca, Fedala and Mehdia in an effort to frustrate any German attempts to disrupt the landing and supply operations.

Aside from the attack on *Le Conquérant*, the first contact made with the enemy came on 17 November when Ens Alton S Allbritton in VP-73's BuNo 7279/9 attacked U-185 70 miles west of Port Lyautey. Four depth charges were dropped on the U-boat, which had reached a depth of 40 metres by the time they exploded. At such a depth, only minor damage was inflicted on the vessel. Four days later VP-92's BuNo 7250/10 attacked U-752 140 miles west of Casablanca. When the U-boat re-surfaced after the attack, its crew noticed that the vessel was leaving an oil slick behind it, so the submarine was reassigned to a more remote operations area 250 miles to the northwest.

In December the urgency of protecting the invasion force gave way to long-range anti-submarine patrols, and VP-73 went on to deliver three more attacks against enemy U-boats by the end of the year, although none resulted in anything other than minor damage being inflicted on the target vessels. This, as VP-73's commanding officer Lt Cdr Alexander S 'Sandy' Hayward rather sadly remarked in a letter to the Chief of Naval Operations, was not due to the inefficiency of the pilots, but to the slow attacking speed of the PBY.

Towards the end of December and throughout January 1943, the U-boats moved out of the coastal areas and took up patrol athwart the convoy lanes beyond the practical range of the amphibian PBY-5As. Soon, USAAF anti-submarine squadrons equipped with longer range

B-24 Liberators were assigned to Port Lyautey, and to them and their Navy PB4Y-1 replacements fell the bulk of anti-submarine warfare off North Africa's west coast. Lacking the range of the Liberators, the PBY-5As of VP-73 and VP-92 would make only four more attacks on U-boats during the remainder of their North African tours.

On 7 May 1943, Lt(jg) J M Larsen was patrolling the Gibraltar approaches in VP-92's BuNo 2461/11 when he attacked, and possibly damaged, what was probably U-447 preparing to run the Straits. Ten hours later the U-boat was sunk by two British Hudsons from Gibraltar. It is open to debate as to whether VP-92 should get some credit for this kill, as it appears that the vessel was damaged by BuNo 2461/11's attack.

In April VP-92 had moved from Casablanca to Port Lyautey, while VP-73 had established a six-PBY detachment at Agadir, further down the coast. The latter facility allowed the unit to extend its patrol area southward, thus making close coverage of the Canary Islands possible.

In June, four of VP-92's PBY-5As joined the detachment in Agadir, and it was from here that Lt George K Morris in BuNo 2461/11 attacked, and very nearly sank, U-193 on 6 July 1943 while providing close escort to the northbound Freetown-Liverpool convoy SL 132. The latter was passing 100 miles southeast of the Canary Islands at the time.

Lt Morris was carrying out a sweep ahead and abeam the convoy when a fully surfaced U-boat was sighted at a distance of five miles, fifteen miles to the convoy's starboard bow. Morris bore down on his prey, releasing four depth charges that appeared to straddle the U-boat. One of the bombs actually struck the antenna deflector and then hit the deck without exploding. A few feet separated life from death, for had the bomb hit the water alongside the boat's hull, U-193 would not have survived the explosion of the 350-lb Mk 47 Torpex-filled depth charge set to detonate some 25 ft below the surface.

The remaining three bombs exploded 70-80 ft abaft the conning tower, lifting the U-boat's stern out of the water and inflicting extensive damage. With all three guns blazing, Morris came around for a strafing run, and his PBY in turn was struck ten times in the wings and hull by the vessel's fierce anti-aircraft barrage. The intense flak wounded five of his crew and killed his second radioman, ARM3c Earl J Gibson, who had leaned out of the waist blister to take photographs of the vessel. The starboard elevator cable was also severed, and all but two strands of the rudder control cable were cut.

Temporary repairs were carried out in the air, but the crew stood by to bail out during the flight back to Agadir, where Morris landed safely. It had not been a one-sided affair, however, for three of U-193's crew had been wounded by the PBY's gunfire and the U-boat seriously damaged.

On 15 July 1943, another of VP-92's Agadir-based PBY-5As (BuNo 7296/6) had a hand in the sinking of U-135. Lt(jg) Robert J Finnie had been detailed to provide escort to the southbound convoy OS 51, which was entering the narrows between the Canaries and the Moroccan coast, when radar contact was made at a range of seven miles. Homing in on the contact, the crew spotted a fully surfaced submarine exchanging fire with three of the convoy's escort vessels. A short while earlier, U-135 had been forced to the surface by the British sloop HMS *Rochester* and corvettes HMS *Balsam* and *Mignonette*.

Without a moment's hesitation, Finnie attacked the submarine, clearing the after deck with his bow gun. As the depth charges went off, the crew manning the U-boat's deck gun were hurled overboard. At this point HMS *Mignonette* came up fast and rammed the vessel, causing it to roll over and sink, but not before 42 sailors had jumped into the water.

AERIAL COMBAT

In one field of endeavour relating to the convoy war, the enemy was growing increasingly aggressive. Ever since the fall of France had yielded Bordeaux and other airfields to the Germans, long-range four-engined Focke-Wulf Fw 200 reconnaissance aircraft had operated against convoys sailing off the European mainland. Initially, these aircraft acted exclusively as spotters for French-based U-boats, but as the war progressed, the Fw 200s started to carry out bombing attacks on the ships.

On 11 July 1943, southbound British troopship convoy 'Faith' was attacked by three Fw 200s 350 miles off the Iberian Peninsula, with serious damage being inflicted on SS *Duchess of York* and SS *California* – both vessels caught fire and had to be sunk by their escorts. The US Navy was asked to provide air coverage the following day for the troopship SS *Port Fairy*, which had been despatched from the convoy to Casablanca with the survivors of the previous day's attack. Two VP-73 PBY-5As were assigned the task, these aircraft being BuNo 08045/2, flown by Lt(jg) John W 'Count' Drew, and BuNo 7279/9, whose pilot is not named.

The two aeroplanes took off shortly after noon, and four hours and twenty-five minutes later met with *Port Fairy* and its surface escort 560 miles from base. While circling the ships at 1500 ft, Drew spotted two enemy aircraft at a distance of 15 miles preparing to carry out a high-level bombing run on SS *Port Fairy*. These were Fw 200s of *Kampfgeschwader* (KG) 40, with aircraft 'F8+AT' being flown by Oberleutnant Joachim Ohm and 'F8+RT' piloted by Leutnant Alfred Arzinger. Both were returning from an armed reconnaissance flight off Portugal's coast when they had sighted the two ships, as well as the PBYs circling above them.

Leaving BuNo 7279/9 behind to provide the two ships with aerial coverage against U-boats thought to be in the area, Drew attempted to gain height in his PBY in order to head off the Fw 200s' attack. However, due to the slow speed of his aircraft, he failed to stop one of the Condors from completing its attack – a small 50-kg bomb dropped from 10,000 ft quite unexpectedly struck *Port Fairy's* stern and started a fire.

For the next hour 'Count' Drew skilfully stymied the Fw 200s' every attempt to bomb the vessel, causing all of their 250-kg high explosive bombs to fall astray. He accomplished this feat by closing on the enemy aircraft head-on each time one of them lined up for a bombing run, not breaking off until just before the two aeroplanes collided. As they came within range of each other, the aircraft exchanged gunfire, and Drew's PBY received two 20 mm hits in the port wing and several smaller holes in the fuselage. In return, Leutnant Arzinger's Fw 200 was hit in the cockpit area, wounding co-pilot Oberfeldwebel Hans Hauenstein in the leg. Although the damage to his aeroplane was only minor, Hauenstein had to have his leg amputated, thus ending to his flying career.

But enemy aircraft were not the only ones the PBY crews had to keep their eyes out for. On several occasions while patrolling in the vicinity of the Canary Islands, Navy aircraft were attacked by biplane fighters of the neutral Spanish Air Force. On one such occasion, VP-73's Ens Sigurd D 'Sig' Bjorkman in BuNo 7300/10 was attacked on 26 October 1943 by a Spanish Air Force Fiat CR.32 biplane fighter flown by Lt Pascual Marciá. The latter fired across the PBY's bow, scoring no hits, but then attacked from directly behind, wounding the port waist gunner, AOM2c Alfred T Williams, and causing slight damage to the aeroplane's tail section. The PBY returned fire, but no hits were observed.

Five days later another CR.32 attacked VP-73's Lt William G Hofman in BuNo 7267/11, the PBY being intercepted by Lt Alfonso Ferrer de Armas off the Canary Islands. With 40 bullet holes in the airframe, flat tyres, a knocked out engine and three wounded crew, Hofman nursed his crippled PBY back to Agadir, where he made a successful water landing. The aircraft was subsequently repaired and returned to service.

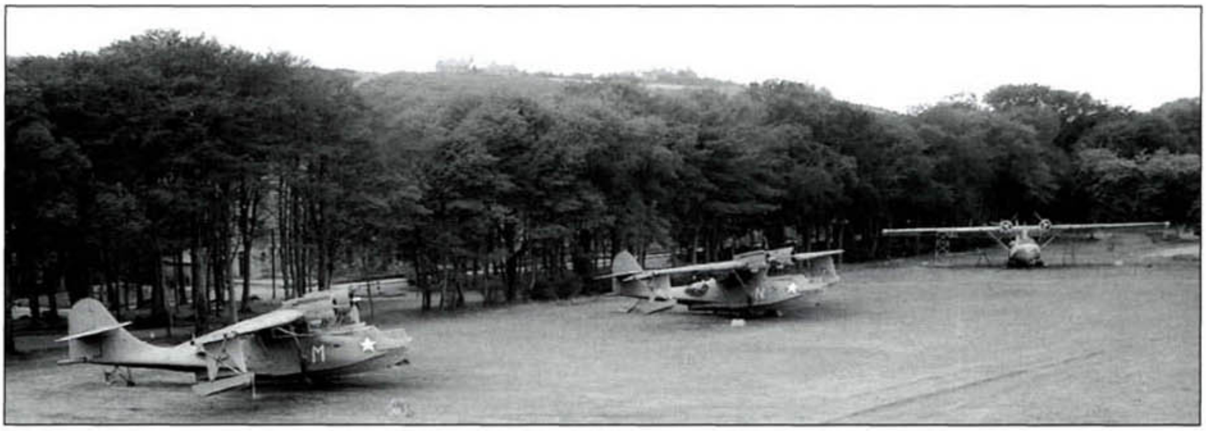
Not all exchanges with the Spaniards were of a hostile nature, however. On 27 December 1944, a PBY-5A flown by VPB-63's CO, Lt Cdr Carl W Brown, was granted permission by the Spanish authorities to land on the island of Tenerife to pick up the seriously ill American Vice Consul. The aeroplane landed at the Los Rodeos military airfield, but a take-off was prevented until the next morning because the heavy PBY bogged down in the soft grassy field. This 'forced' the crew to spend a delightful evening at the opera as guests of the military governor of the Canaries!

On Christmas Day 1943 VP-73 flew its final operational sortie under FAW 15 control, and three days later the last of its aircraft departed Port Lyautey for the United States. VP-92 was soon to follow, being relieved at Agadir by the first French PBY-equipped patrol squadron, VFP-1.

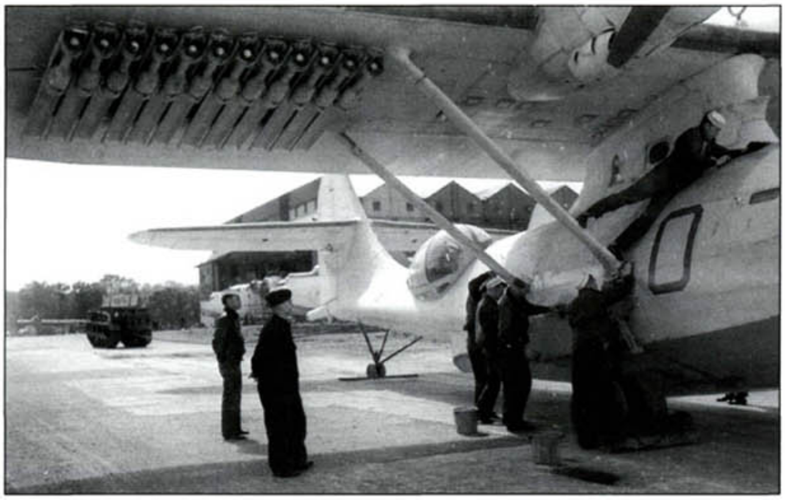
'MAD CATS'

The most unusually equipped aircraft to serve within the Moroccan Sea Frontier were the 'MAD Cats' of VP-63, so called because of the Magnetic Anomaly Detection (MAD) gear they carried for the location of submerged submarines.

VP-63 was established in September 1942 as a regular PBY-5A-equipped squadron for operations with the Pacific Fleet. At the time of its commissioning, it expected to deploy to Alaska for its first tour of duty following shakedown training in Alameda. That was not to be the case, however, for VP-63 was destined to become a specialised squadron with unique equipment and doctrine for hunting submerged submarines.



While serving in Great Britain under the operational control of RAF Coastal Command, VP-63's PBY-5s had their hull numbers replaced by RAF-style code letters. BuNos. 08349/13 and 08437/14 were assigned the letters M and N respectively, these being the 13th and 14th letters in the English alphabet. The original numbers were retained, however, under the port wing, and repeated in small digits on the rear hull. Seen here at the squadron's base at Pembroke Dock, in Wales, are BuNos. 08349/M and 08437/N, both wearing the standard Blue Grey over Light Grey camouflage, while a third (unidentified) PBY-5 wears all-white camouflage authorised for use by FAW 7 patrol aircraft (*80-G-53253*)



PBY-5 BuNo 08245/O of VP-63 is prepared for flight at Pembroke Dock, Wales, in the autumn of 1943. Seen here to good advantage are the 654-lb rocket propelled retro-bombs, with 12-15 being carried under each wing. Each bomb contained a 37-lb Torpex explosive charge, and they would be fired backwards in order to cancel out the aeroplane's forward movement and drop straight down on its target in the event of a MAD contact. While being flown by Lt(jg) Thomas R Woolley on 24 February 1944, BuNo 08245/15 was one of two 'Mad Cats' involved in the sinking of U-761 off the Moroccan port of Tangier. This was the first enemy submarine to be located by MAD detection (*80-G-53255*)

Initially, the MAD gear and retro-bomb racks were installed on just three of the squadron's PBY-5As, but because of the equipment's weight, the lighter non-amphibian PBY-5 was found to be better suited to the mission. Between January and March 1943 the unit received 15 new PBY-5s that had been converted for MAD operations.

The MAD acronym had originally stood for Magnetic Airborne Detector, but this was later changed to Magnetic Anomaly Detection. This piece of equipment, developed by US scientists, was essentially a sensitive magnetometer installed in a cone extending abaft the PBY's rudder. The MAD gear made it possible for crews to detect and record anomalies in the earth's magnetic field, such as those caused by the presence of a submerged submarine. While the range of the equipment was limited to just 400 ft, its accuracy could determine the position of a submerged object to within several feet.

One of the problems associated with the employment of MAD was that of developing a weapon which would take advantage of the gear's extreme accuracy. The type of bomb finally settled on was a 654-lb Torpex-filled contact depth charge, which was fired by a rocket motor in the opposite direction to the aeroplane's line of flight at a speed equal to the PBY's forward movement. This resulted in a near-vertical trajectory for the 'retro-bomb', as the weapon was called, so that it hit the water in exactly the position over which the PBY was flying when the bomb was fired.

Another problem which presented itself was that of marking the exact place of contact for tracking purposes before a bombing attack could be carried out. This was solved by retro-firing smoke markers which were fired automatically from the PBY's tunnel hatch once the MAD gear had detected a submarine. Before long, the passive listening sonobuoy was also added to the 'MAD Cats'' equipment, giving birth to the world's first integrated airborne attack system for use against submerged submarines.

Once equipped, VP-63 headed to the East Coast. Following searchlight training in Elizabeth City, North Carolina, the unit deployed to Quonset Point for operations with the Aircraft Anti-submarine Warfare Development Detachment, Atlantic Fleet. From here, PBYs were detached to Jacksonville and Key West, as well as Bermuda, to follow up on U-boat sightings, but in each case the trails were cold.

Even though the enemy did not show itself, these detachments were not an entire waste of time. On 9 May 1943, Lt 'Sully' Kauffman of the Bermuda detachment was carrying out an anti-submarine sweep 250 miles from Bermuda in BuNo 08146/6 when he made an open-sea landing to rescue four British seamen from the 12,800-ton British MS *Melbourne Star*, which had been torpedoed and sunk 37 days earlier.

Two weeks later Lt Cdr Curtis Hutchins and Lt(jg) Ralph C Spears located the crew of a missing Bermuda-based PB2Y Coronado from VP-15. Despite a low ceiling and poor visibility, they managed to keep in contact with their rafts until a surface vessel arrived on the scene and picked them up.

With no U-boat activity off the East Coast to speak of, VP-63 was sent to Iceland in June to perform anti-submarine patrols. It was also to stand by for any 'hot' contacts that emerged, although again no U-boats were found, as the enemy had been run out of the area several weeks earlier.

There was now little hope of catching a U-boat in the submarine-free North Atlantic, so VP-63 was ordered to the United Kingdom to take part in the Bay of Biscay U-boat offensive under the control of RAF Coastal Command. Between 20-22 July, its 15 PBY-5s arrived at RAF Station Pembroke Dock, in Wales, VP-63 thus becoming the first US Navy unit to operate from Great Britain in World War 2.

The unit's first contact with the enemy came on 28 July when Lt(jg) Sam R Parker in PBY-5 BuNo 08439/12 visually sighted U-262 and U-760 on the surface off Cape Finisterre. In accordance with standing instructions, Parker stood by and homed other aircraft to the area while exchanging gunfire with the two U-boats. When reinforcements arrived, the two submarines dived and Parker pushed his aeroplane over and attacked. He released his retro-bombs ahead of the diving swirl of one of the vessels, but they missed. Following his attack, Parker's MAD gear failed, so he could not locate the submerged U-boats.

Four days later, on one of VP-63's first patrols down to the Bay of Biscay, Lt William P Tanner's BuNo 08231/10 *Aunt Minnie* was jumped by at least five Junkers Ju 88s from KG 40. Badly wounded, and with seven of his crew killed, Bill Tanner and his co-pilot Lt(jg) Robert I Bedell showed exceptional piloting skills to successfully ditch their burning PBY despite having just one operable engine and no aileron or rudder control. Only the two pilots and a waist gunner survived the encounter with the heavily armed Ju 88s, and they were duly rescued by the British sloop HMS *Bideford* after spending 20 hours in a raft.

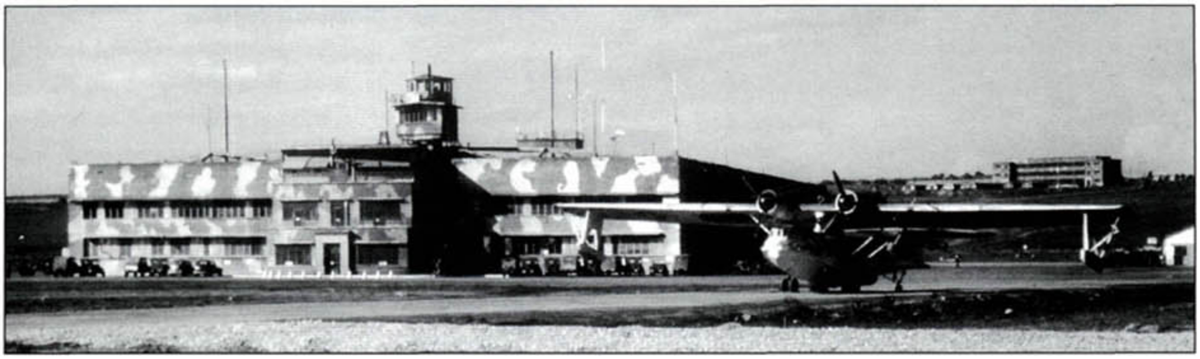
The downing of *Aunt Minnie* was credited to Leutnant Knud Gmelin of 13./KG 40, who was flying Ju 88C-6 'F8+IX' at the time. He too was forced to ditch his aeroplane before reaching the French coast on account of damage inflicted by the PBY's gunners.

Lt Bill Tanner was a veteran flying-boat pilot, having seen action in VP-14's PBY-5 BuNo 2419/1 flying from Kaneohe Bay, Hawaii, on the morning of 7 December 1941. He had sighted, and attacked, a Japanese midget submarine about to enter Pearl Harbor an hour prior to the devestating strike by carrier aircraft on the Pacific Fleet base. Tanner thereby became the first US Navy pilot to attack an enemy submarine in World War 2.

GIBRALTAR 'FENCE'

The PBY was certainly no match for anything the Luftwaffe was flying over the Bay of Biscay, and following the loss of *Aunt Minnie*, VP-63's

'Five down, 58 to go'! VP-63's mission tally was posted on the squadron's maintenance hut at Port Lyautey (*NARA 80-G-700529*)



PBY-5 BuNo 08350/10 of VP-63 sits on the ramp outside the operations building at NAS Port Lyautey, in French Morocco, in 1944-45. Formerly assigned to VP-81 and then VP-34 in the Caribbean, BuNo 08350 arrived freshly overhauled at Port Lyautey from Norfolk on 26 May 1944 as a replacement for BuNo 08231/10, which had been shot down by German aircraft over the Bay of Biscay the previous August (*NARA 80-GK-5250*)

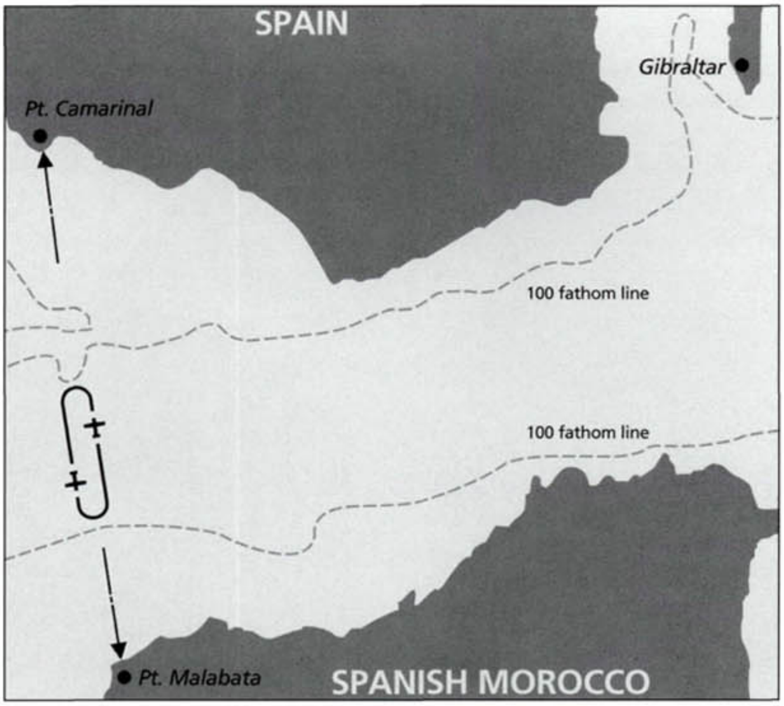
patrol area was moved further out to sea, beyond the reach of German air patrols. However, due to MAD's extremely limited range, it was impractical to sweep vast expanses of ocean for submarines, so the unit had little opportunity to take advantage of its specialist equipment. Open ocean missions could be performed by any regular patrol squadron, so before long VP-63 found itself on the move once again.

In December the unit received orders to relieve VP-73 in Port Lyautey. During the five months it had been based in the UK, its PBYs had flown 4016 operational hours in 338 sorties – more than any other squadron attached to RAF Coastal Command's No 19 Group during the same period. Except for a 'well done' from the 'Brits', the squadron had precious little to show for its effort, but that was soon to change.

Following the unit's arrival in Port Lyautey, it initially appeared that VP-63 was going to be used on regular anti-submarine patrols that made no use whatsoever of its specialised equipment and training. However, it soon became evident that VP-63 had been sent to the one place in the world where its equipment could be employed to its fullest potential.

Ever since the beginning of the war, German U-boats had been passing through the narrow Straits of Gibraltar into the Mediterranean, where they posed a constant threat to Allied shipping. This was a situation that suited the inherent limitations of MAD, and before long the 'MAD Cats' had commenced flying two-aeroplane magnetic barrier patrols across the Straits between the Spanish and Moroccan coasts.

The Gibraltar 'fence'



The Gibraltar 'fence', as it was called, was a racetrack pattern that required a steep 180-degree turn to be made every one minute and twenty seconds, and it was flown by two PBYs at an altitude of 50-100 ft from dawn to dusk. It was not an easy pattern to fly at such low altitude, but its small size ensured that a U-boat could not pass through the 'fence' without coming within MAD range. Placed on the Straits' Atlantic side, the MAD barrier

PBY-5A BuNo 48318/18 of VPB-63 and a K-type blimp of ZP-14 operate in close proximity in the Gibraltar Straits. The PBYs would fly the Gibraltar 'fence' during daylight hours and the blimps at night when the PBYs could not be employed on account of the low 100-ft patrol altitude required for MAD operations. By the time the blimps arrived, however, the Germans had stopped sending U-boats into the Mediterranean. BuNo 48318 would be the last Navy PBY to sink a German U-boat when it bombed U-1107 off the French coast on 30 April 1945 (*NARA 80-G-48763*)

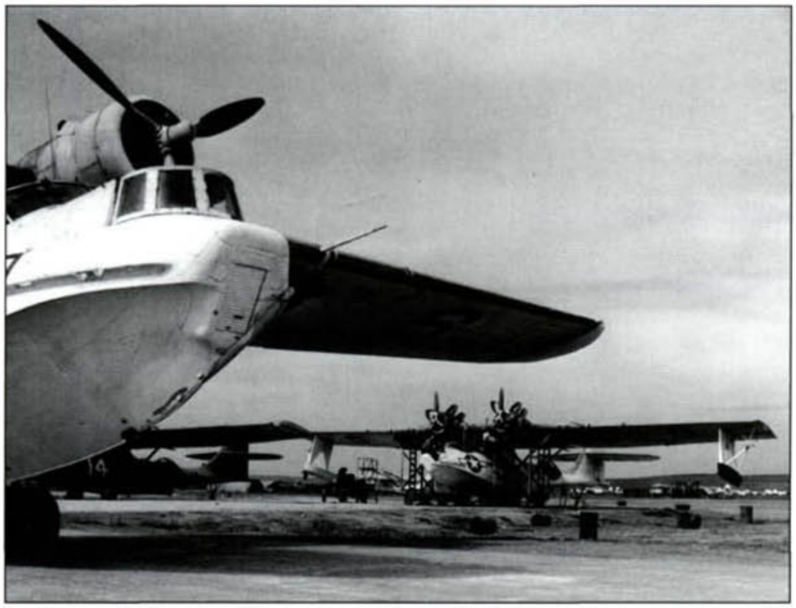
patrol was supplemented by surface vessels patrolling the Mediterranean side, and they would engage if necessary after the U-boat had been detected, tracked and subjected to a retro-bombing attack. This was the plan devised to seal off the Straits of Gibraltar, and thus turn the Mediterranean into an Allied 'lake' free of any U-boats.

On 18 January 1944, VP-63 commenced flying the Gibraltar 'fence'. After several false contacts that, for the most part, were probably uncharted shipwrecks, the squadron was rewarded for its 11 months of intense and dedicated efforts when, on 24 February, BuNos 08437/14, flown by Lt(jg) Howard J Baker, and 08245/15, flown by Lt(jg) Thomas R Woolley, detected, tracked and attacked U-761 (commanded by Oberleutnant Horst Geider) in conjunction with British naval vessels, a US Navy PV-1 Ventura and an RAF Coastal Command Catalina.

After Woolley's MAD operator, ARM2c James A Cunningham Jnr, detected the submerged U-boat, the two aeroplanes tracked it with retro-flares for almost an hour before firing 47 retro-bombs, which probably missed their target. Twenty seconds later the destroyer HMS *Anthony*, in firm Asdic (sonar) contact, dropped ten depth charges, after which U-761 broke the surface, only to disappear again one minute later. Another British destroyer, HMS *Wishart*, now joined *Anthony*, and each vessel dropped ten depth charges which again forced the boat to the surface.

At this point a US Navy PV-1 Ventura from VB-127 (BuNo 29921/46) and an RAF Catalina from No 202 Sqn arrived on the scene, both of which dropped depth charges that straddled the already disabled U-boat as its crew was abandoning it.

Lt(jg) Howard J Baker leans out of the cockpit side window of VP-63's PBY-5 BuNo 08437/14 and passes a message to one of his groundcrew at Port Lyautey. The submarine symbol painted to the right of the 'barless' national insignia denotes the part played by the PBY in the sinking of U-761 on 24 February 1944 – Baker was also at the controls of this aircraft at the time. Note that the engine cowls and propeller hubs are painted in different colour. The PBY also boasts a rotatable radar antenna on the hull, forward of the side number. In search mode the antenna would point sideways as shown, but it could be hydraulically rotated through 90 degrees for homing (*NARA 80-G-700506*)



MAD-equipped PBY-5s BuNos 08146/6, 08437/14 and 08157/9 are prepared for their next sorties by groundcrew from VP-63 at Port Lyautey. Unlike other Atlantic Fleet patrol squadrons, VP-63's aircraft had the side numbers repeated in black beneath their port wings. Note that '14' still wears the early camouflage of Blue Grey over Light Grey (*USN*)

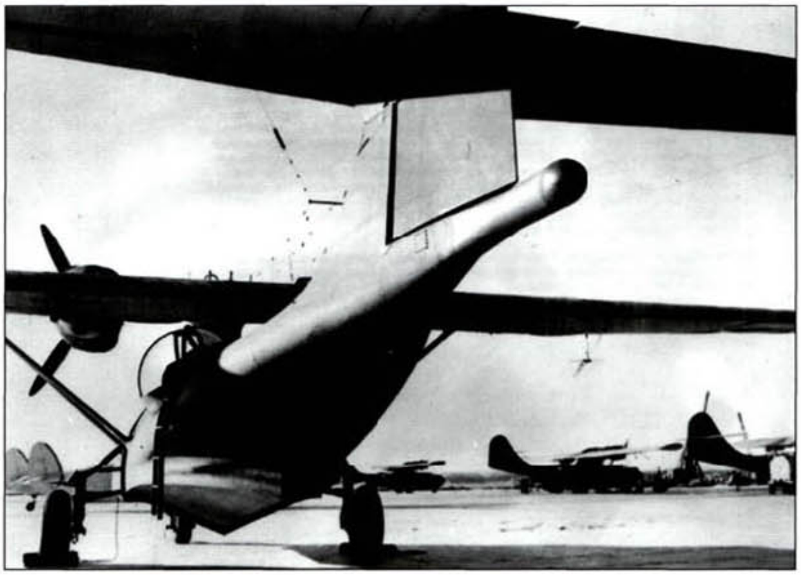
The destruction of the second U-boat detected by the 'MAD Cats' was a carefully planned affair. A submarine had been located two days earlier west of Gibraltar, and the vessel gave every indication that its intention was to run the Straits. It was estimated that the U-boat would pass under the MAD barrier sometime during the morning of 16 March. Nothing was left to chance, and it was decided to fly an additional single-aeroplane 'fence' over the eastern end of the Straits in the event that the enemy passed the position of the usual barrier before first light, and prior to the PBYs' arrival on station.

During the afternoon of the 15th all three 'MAD Cats' arrived in Gibraltar in case morning fog prevented them from departing Port Lyautey early the following morning. At daybreak, they took off for the Straits, with Lt(jg) Van A T Lingle, in BuNo 08176/1, and Lt Ralph C Spears, in BuNo 08154/8, flying the western 'fence', while Lt(jg) Matthias J Vopatek Jnr took the eastern patrol line. Just as anticipated, U-392 (commanded by Oberleutnant Henning Schümann) arrived at the 'fence' soon after dawn, and it was immediately detected up by Lt Spears' MAD operator.

For nearly two hours the three PBYs tracked the submerged U-boat before attacking it with 47 retro-bombs, which this time appear to have found their target. The destroyer HMS *Vanoc* and frigate HMS *Affleck*, having stood off while the PBYs did their job, then took over the attack, firing Hedgehog contact bombs that sent U-392 to the bottom.

The third, and last, submarine caught by the Gibraltar MAD barrier was U-731 (commanded by Werner Techand). During the afternoon of 15 May 1944, Lt(jg) Matthias J Vopatek, in BuNo 08439/12, and Lt Hubert L Worrel, in BuNo 08176/1, caught the U-boat as it passed through the 'fence'. The vessel had been tracked by the two aeroplanes for 15 minutes when Lt(jg) Vopatek decided to fired 30 retro-bombs at it, followed by Worrel's 24 weapons 22 minutes later.

The official notes for this photo state that PBY-5 BuNo 08176/1 of VPB-63 is taking off from the Sebou River, in Port Lyautey. However, the absence of the aircraft's MAD boom suggests that the shot might have been taken in December 1944, when the aeroplane was detached from the squadron and operating in the USA. BuNo 08176 shared in the sinking of two U-boats while assigned to VP-63, namely U-392 on 16 March 1944 and U-731 on 15 May 1944 (*NARA 80-G-700528*)



In the summer of 1944, VP-63 acquired eight PBY-5A amphibians in addition to its regular establishment of 15 PBY-5s. Due to frequent morning fog at Port Lyautey, the morning sorties of the Gibraltar Fence would start from Gibraltar and land at Port Lyautey, while the afternoon sorties would start from Port Lyautey and end in Gibraltar. The heavy swells at the latter base often caused damage to the MAD cones fitted to the PBY-5s, which is why the PBY-5As were acquired. The PBY-5As received side numbers 16 to 23, while the PBY-5s were numbered 1 to 15 (*USNI*)

Splintered wood was observed on the surface following the attack, indicating that the bombs had found their target. However, U-731 was still underway on an easterly course, and it continued to be tracked until the armed trawler HMS *Blackfly* and the escort vessel HMS *Kilmarnock* arrived on the scene. The vessels duly engaged the submarine with depth charges and Hedgehogs, which permanently sank the U-boat.

Of the 11 submarines that had attempted to run the Straits after VP-63 commenced flying the Gibraltar 'fence', three had been detected by the 'MAD Cats' and sunk. And following the sinking of U-731, only U-960 was to successfully run the Straits of Gibraltar into the Mediterranean, where it was sunk two days later. At the end of May 1944 the Germans put a stop to further U-boat sailings into the Mediterranean, partly at least because of losses inflicted by 'fence' patrols.

'MAD CATS' DETACHED TO GREAT BRITAIN

In January 1945 four PBY-5As from VPB-63 were detached to the US Navy base at Dunkeswell, in Devon, and later to its satellite field at Upottery, from where they were to conduct MAD sweeps in the English Channel. The move from Port Lyautey to Dunkeswell was not without incident, as Lt Frederick G Lake's BuNo 46518/22 was hit by flak whilst overflying the German-held island of Jersey on 11 January. The crew had to make an emergency landing in Lessay, France, and from here the aeroplane was flown to Cherbourg for repairs, before continuing its flight to Dunkeswell two days later.

Lt William D Ray in BuNo 48289/23 was not so fortunate during his transit flight, however. Having encountered bad weather en route, he made a forced landing in a small reservoir near Glomel, in France's Province of Cotes du Nord. Whilst attempting to take-off the following day, the aeroplane failed to become airborne and crashed into the reservoir's bank. The crew escaped injury, but the PBY was written off.

Over the next few months the UK detachment carried out MAD patrols over the English Channel, and it was during one of these sorties,

On 11 May 1945, Lt William D Ray of VPB-63 accepted the surrender of U-541 some 300 miles west of Gibraltar. The aeroplane circled the boat for two hours, homing surface vessels to the scene. Commissioned in March 1943, U-541 was on her fifth war patrol when Germany surrendered. Not a particularly successful boat, U-541 had the sinking of just one freighter to its credit (*NARA 80-G-319659*)

on 30 April 1945, that VPB-63 made its last U-boat attack of the war. Lt Frederick G Lake was carrying out an anti-submarine patrol off the French coast in BuNo 48318/R when a schnorkel and periscope were sighted about two miles off the port beam. Diving from 2000 ft, Lake fired 24 retro-bombs from 100 ft on the peak swing of the MAD signature. One explosion was observed that brought debris and oil to the surface, thus signalling an end to the short-lived career of U-1107 (commanded by Kapitänleutnant Fritz Parduhn).

FRENCH SQUADRONS

Discussion of the PBY's contribution in the North African theatre cannot be considered complete without mention of the two French PBY-equipped patrol squadrons that operated under FAW 15 control. Commissioned and trained by the US Navy in America, each unit received a complement of 15 PBY-5As under lend-lease from naval contracts.

6ème Flottille d'Exploration (6 FE) and *8ème Flottille d'Exploration* (8 FE) were duly assigned the US naval designations French Patrol Squadrons 1 and 2 (VFP-1 and VFP-2), respectively, and both came under the administrative and operational control of the US Navy.

As the first of these two squadrons, 6 FE reported for duty in Port Lyautey on 18 February 1944. After a brief period of refitting, the unit departed Port Lyautey for training and duty in Agadir, from where it commenced operations on 1 March 1944 after relieving VP-92, which transferred to the Caribbean. Here, 6 FE's primary missions would be anti-submarine patrols, shipping protection and Air-Sea Rescue (ASR) flights.

Three days after the Allied landings in southern France on 15 August 1944, a detachment was sent to Ajaccio, in Corsica, to perform ASR and mine-spotting in and around Italian, Sicilian and Corsican harbours. The rest of the unit followed shortly afterwards. In October 1944 6 FE was relieved in Ajaccio by 8 FE, after which it headed to Agadir to convert to the Lockheed PV-1 Ventura. Its PBYs were in turn transferred to the newly-created French utility flight *Section de Transport d'Agadir*.

8 FE's first section arrived in Agadir on 7 September 1944, and it sent a three-aeroplane detachment to Ajaccio to relieve 6 FE the following month. The squadron's remaining eight aeroplanes followed in two sections, the last arriving on 15 November.

In October a detachment was sent to Cuers, in southern France, for mine-spotting along the French Mediterranean coast. Three more PBYs were detached to Grottaglie, in Italy, from where they flew mine-clearing missions off the German-held Italian coast, as well as the approaches to Athens and Patras, in Greece. To these missions was added, in December, the transportation of personnel from Cuers to Cognac, near France's Atlantic coast – each airlift averaged 40 persons per day.

In anticipation of increased U-boat activity in the Mediterranean approaches, 8 FE was regrouped in Port Lyautey in early January 1945 to provide anti-submarine coverage of the Madeira-Gibraltar-Casablanca shipping lanes. However, following the end of hostilities in Europe, the squadron moved back to Agadir, from where it raised the French flag and transferred from US Navy to local control.

SEARCH AND RESCUE

Of all the roles the PBY would be called upon to perform during the war, that of search and rescue was doubtlessly the most rewarding, and one which earned the 'Ugly Duckling' a very special place in the hearts of the thousands whose lives it saved.

In the beginning, search and rescue was unorganised and conducted in a haphazard manner, with the USAAF and US Navy making use of whatever aircraft and aircrew were available – the former were not properly equipped for the mission and the latter lacked adequate training. Before long, however, patrol squadrons were being assigned rescue duty, followed eventually by the establishment of dedicated rescue squadrons. This was especially true in the Pacific, where the enemy could often be reached only after a long flight over water, and to a lesser extent in the European and Mediterranean war theatres.

Long-distance flights by tactical aircraft being ferried to the various theatres of war and the air transportation of personnel and munitions across the globe were additional factors which further added to the need for a specialised rescue service.

While the waters surrounding the Pacific islands and some areas of the central Atlantic were calm enough to allow water landings to be made, the stormy North Atlantic, with its heavy swells, was decidedly not. Such conditions posed enormous problems for the heavier PBY-5A amphibian, which had been issued to PBY squadrons in the North Atlantic in 1942-43. These squadrons quickly discovered that the aircraft's bombardier window and nosewheel doors were apt to stove in or spring open when taking off or landing in rough seas.

And that is exactly what happened on 28 March 1942 when VP-73's BuNo 2464/11 was lost at sea 300 miles south of Iceland. Ens Ralph E Boyd was escorting a naval task unit when its commander asked him to land and evacuate a seaman from the destroyer USS *Decatur* (DD-341), who was suffering from acute appendicitis. Upon landing, the flying-boat bounced on a swell, then hit another and started shipping water through the bow. Full throttles were applied in an attempt to abort the landing, but the port wingtip float 'snubbed' a swell and the aeroplane water-looped. The PBY sank in 15 minutes, but except for minor injuries suffered by two of its crew, all escaped the crash unharmed and were picked up by one of the task force's destroyers.

The crew of Iceland-based PBY-5A BuNo 7273/8, flown by VP-84's Lt(jg) Douglas S Vieira, was not so lucky when it made an open sea landing on 11 June 1943 midway between Iceland and the Faroe Islands in order to rescue the crew of a downed RAF Fortress. This was the same crew that less than a month earlier had sunk U-640.

According to the aeroplane's only survivor, ARM1c Lionel F Pelletier, 'The commander made a run along the top of a long, broad master swell, but before the aeroplane lost its speed, a cross-wave hooked a wingtip. The wave smashed into us, split the bow of the ship wide open, and we went under'. The PBY sank rapidly, but its nine-man crew succeeded in boarding a rubber life raft. However, suffering the effects of cold, seasickness, salt water and injuries, one by one, they succumbed until Pelletier was the only one left when the raft was located five days later.

But rescue operations in the North Atlantic area were not confined to the open sea alone. In Greenland, under the leadership of the renowned polar aviator and arctic survival expert Lt Col Bernt Balchen, USAAF, a single detachment of Navy PBY-5As would pull off some of the most dramatic rescue operations of the war.

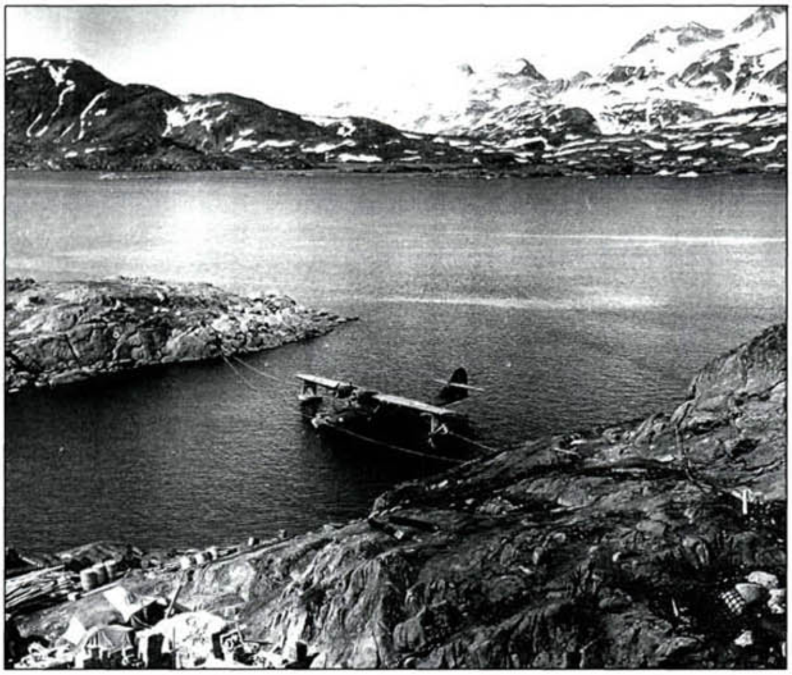
'GREENLAND SALVAGE COMPANY'

Since the Navy's unsuccessful attempt to operate PBY-5 flying-boats from Greenland in the autumn of 1941, two airfields had been built by the spring of 1942 to handle the massive flow of air traffic from the American 'arsenal of democracy' to the European theatre of war. One was Bluie West 1 (BW-1) at Narsarsuak, 100 miles north of Cape Farewell, and the other was Bluie West 8 (BW-8) at Søndre Strømfjord, located just above the Arctic Circle, some 430 miles farther up Greenland's west coast. Lt Col Balchen was the commanding officer of the latter base.

The latter needs little introduction to the aviation-minded. The Norwegian-born American had been a volunteer in the Finnish War of Independence, a pilot in the Norwegian Naval Air Service and polar explorer Adm Richard E Byrd's pilot on his 1927 transatlantic crossing. Balchen had also flown over the South Pole in 1929, and subsequently became the first person to fly over both the North and South Poles.

By 1941 Balchen was urgently ferrying Catalinas previously destined for service with the RAF to the US Navy in Philippines. He was being helped in this endeavour by fellow future National Aviation Hall of Fame enshrinee Clyde 'upside-down' Panghorn, when the USAAC's Gen Henry 'Hap' Arnold had the FBI trace him to Manila to ask him to join the Army Air Corps and build, organise and command an air base at Søndre Strømfjord, in Greenland.

The northern ferry route from the United States to the British Isles via Labrador, Greenland and Iceland was inaugurated in April 1942. Two months later the large-scale movement of both fighters and 'heavies' as part of Operation *Bolero* (the code name for the build-up of US armed forces in the UK for an invasion of Europe) commenced.



VP-93's PBY-5A BuNo 02972/4 is seen firmly moored to ringbolts during a break in survey flying for an airfield site on Greenland's east coast. This photograph was taken near the site of Ikateq, where an emergency airfield was eventually established and code-named Bluie East 2 (BE-2). The 50-gal steel drums in the lower left corner contain aviation gasoline that had been placed there for use by Charles Lindbergh during his 1933 survey flight in search of a northern air route between North America and Europe, via Greenland and Iceland (*Bernt Balchen, courtesy of Mrs Audrey S Balchen*)

At this time the Army Air Force did not possess an ASR organisation, nor aircraft suitable for such operations, so the Navy decided on its own initiative to send six PBY-5As to Greenland to operate from its two bases. The tasking was given to VP-93, which had only just become operational, and was in the process of moving from Quonset Point to Argentia.

The squadron's executive officer, Lt Cdr Al E Loomis, arrived in Greenland with half of VP-93 on 12 May 1942, and within 48 hours he had departed for BW-1 with three PBY-5As. A short while later a second three-aeroplane detachment, led by Lt Aram Y 'Dick' Parunak (a former Ursinus College football star), left for BW-8. When Parunak arrived at the base with his three PBYs on 28 May, he was met by Bernt Balchen. The two pilots immediately hit it off, and by the time Parunak departed Greenland two months later, the detachment had built up an enviable reputation as the 'Greenland Salvage Company'.

MY GAL SAL

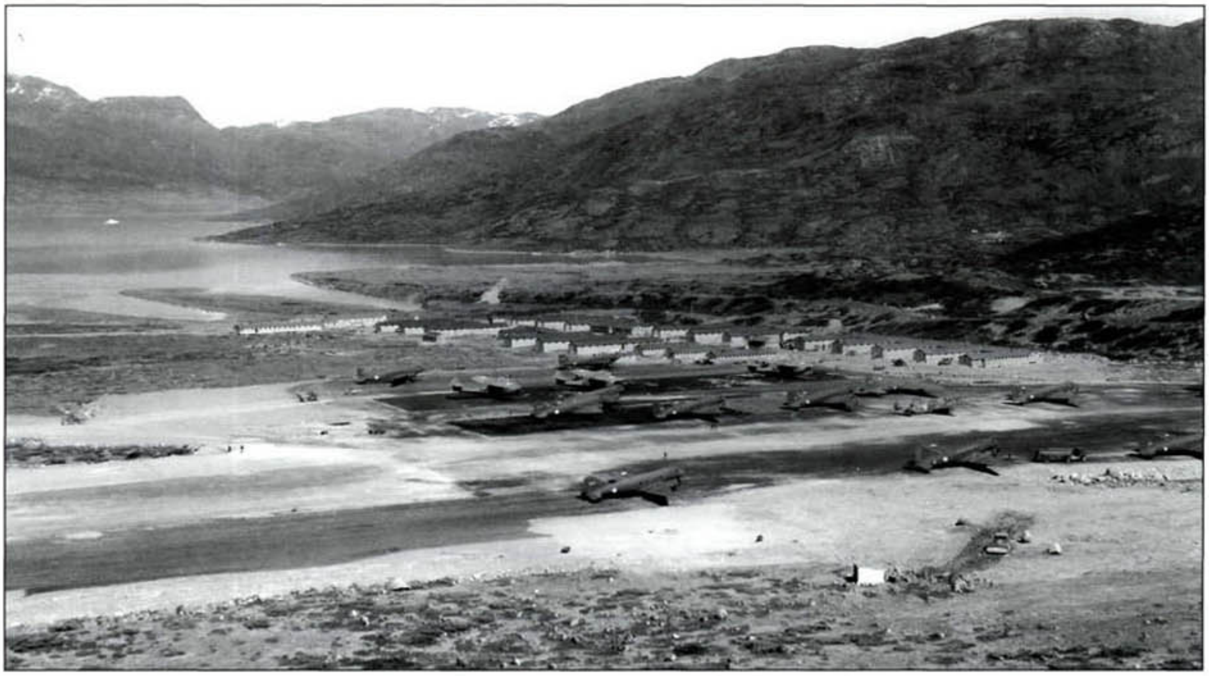
On 26 June 1942, three B-17Es of the first *Bolero* movement to pass along the northern ferry route became lost and forced-landed in Greenland as they ran out of fuel. One ditched in the sea and the other crash-landed, and their respective crews were picked up by VP-93's PBYs. The third bomber, named *My Gal Sal* (41-9032), force-landed on the ice cap 115 miles south of BW-8. Lt George C Atteberry of the BW-1 detachment located the aeroplane in a heavily crevassed area, but since the site was closer to BW-8, Lt Col Balchen was given the task of rescuing the crew.

The aeroplane's 13 occupants were safe, but the site was inaccessible from the coast. With no ski-equipped aircraft available to lift the men out, Balchen and Parunak were surveying the area from the air for an alternate rescue plan when they observed a lake forming from melting ice in a basin on the ice cap, some 12 miles from the stranded airmen. The lake was at an elevation of 4215 ft.

After making several speed runs to determine the available alighting area, Dick Parunak returned to BW-8, where BuNo 02972/4 was stripped of all non-essential gear before taking off again with four crew, a three-man rescue party, including Bernt Balchen, and 500 gallons of fuel. Landing on the lake was a tricky affair, and it required the pilot to 'grease' it in so as not to cause a disturbance on the water that might open a fracture on the bottom of the lake and discharge it. All went well, however, and the three-man rescue party disembarked in a rubber dinghy with their equipment, after which the PBY returned to base.

Bad weather, fissures and rivulets prevented the rescue party from reaching the B-17 for a further two days. By radio, they requested that Parunak guide them from the air over a higher and more desirable route, which the pilot duly did by dropping crude maps to the party as they progressed. After a 12-hour trek over rough terrain, the rescue party arrived back at the lake with 13 totally exhausted survivors.

Lt Aram Y 'Dick' Parunak, senior aviator within VP-93's Blue West 8 detachment, poses with his PBY-5A BuNo 02972/4 after landing on a temporary icemelt 'lake' at an elevation of 4215 ft on the Greenland ice cap on 3 July 1942. He had made this audacious landing so as to rescue the crew of the downed USAAF B-17E *My Gal Sal* (*Bernt Balchen photo, courtesy of Mrs Audrey S Balchen*)



This panoramic view of BW-1, in Greenland, shows the airfield and surrounding terrain in August 1942. One end of the single 5000-ft Marston steel-matted runway can be seen to the left in the photograph, with C-47s parked on its extension. Besides 11 C-47s, a B-17 and an RAF Hudson, three US Navy PBY-5As can also be seen in the shot. These belonged to a three-aeroplane detachment from VP-93 that had been deployed at this forward base since the previous May for both rescue and anti-submarine duties (*NARA 80-G-061966*)

Parunak eventually had to make three more landings on the ice in order to extricate all the men. This mission marked the first time that an aircraft had landed on and taken off from the Greenland ice cap. Within days the lake had gone.

In 1964 *My Gal Sal* was rediscovered, and 31 years later its wreckage was reclaimed from the ice cap and brought to the United States, where it is presently under restoration to static display at Blue Ash Airport in Cincinnati, Ohio.

One week after the *My Gal Sal* operation, the 'Greenland Salvage Company' was called upon to rescue the Greenland Base Command's new CO, Col Robert W C Wimsatt, whose AT-6 Texan had been forced down on a gravel moraine in a virtually inaccessible inland area 30 miles northeast of BW-1. Bernt Balchen had been summoned to BW-1 to meet with Col Wimsatt, and since Dick Parunak was under orders to return to Argentia and report on his rescue activities, he offered Balchen a lift.

Upon their arrival at BW-1, they found that Col Wimsatt's aircraft had been reported missing. Again, the PBY proved its worth, for it soon located the wreckage of Wimsatt's crashed AT-6. Parunak then landed BuNo 02972/4 on a nearby lake at a height of 2100 ft. Balchen and BW-8 physician Maj McBride, who had accompanied his CO to BW-1, then hiked to the crash site carrying a rubber raft that they thought might be needed to cross the watery obstacles that streamed from the glacier front close by. Both the injured colonel and his sergeant were brought out by Balchen and McBride the following day.

THE ICE CAP STORY

What has been termed 'The Ice Cap Story' was a grim and drawn out fight with Greenland's inland ice that lasted from 5 November 1942 to 18 May 1943, and exacted a high price in both aircraft and lives.

On 5 November 1942, an Air Transport Command C-53 Skytrooper en route from Iceland to Greenland was reported lost off Greenland's east coast. Four days later, a transient B-17F (42-5088) that had been diverted from its flight to England to search for the missing aircraft crashed in a heavily crevassed area on the inland ice when it was inadvertently flown into the ice cap some 40 miles off Greenland's east coast. The nine personnel aboard the aircraft survived the crash with only minor injuries, and they had soon received food, clothing and other supplies that were dropped to them by air while plans were made to get them off the ice cap.

On 28 November USCG Cutter *Northland's* Grumman J2F-4 Duck, flown by Lt John Pritchard, made a wheels-up landing on the ice near the crash site and brought out two of the B-17's crew. The following morning a ground rescue team arrived at the crash site, and things began to look much better for the stranded airmen. However, a series of disasters then befell the rescue attempt.

A crew member and rescuer Lt Max H Demorest of Arctic fame were killed when their sled dropped into a crevasse and disappeared. Later that same day Lt Pritchard's Duck went missing on its second evacuation attempt, taking three men with it. On 6 December, an attempt was made to evacuate the B-17's navigator, Lt William F O'Hara, whose feet had turned black with gangrene. One of the rescue team was lost when he broke through a snow bridge and disappeared into a crevasse. Rather than return to the crash site, the men decided to press on or they would lose O'Hara as well. Their motor sled then broke down, and they were left with no choice but to dig in and wait for help.

The days dragged on through Christmas, but the morale of the men was sustained by air drops that were made whenever the weather permitted. With the coming of winter, and worsening weather, a rescue by motor sleds was ruled out. Several dog teams started out, but all were forced to turn back on account of the weather – some lost most of their dogs, and barely made it back to base. This was the situation facing Bernt Balchen when he was summoned to BW-1 for a conference with Col Wimsatt and Adm Edward H 'Iceberg' Smith, commander of the Greenland Patrol, in late December.

All attempts to rescue the men by ground parties had failed, so Balchen proposed to have a PBY belly land on the ice cap and evacuate the airmen. It was a bold idea, and one not without considerable risk, for nobody really knew whether the PBY's hull could withstand this type of battering.

While the Navy dragged its feet in giving its consent to Balchen's plan, a Barkley Grow T8P-1 ski-equipped aircraft, leased from Canadian Maritime Airways, took off to attempt a landing on the ice cap and rescue the stranded airmen. It disappeared over the east coast, but fortunately its crew survived to be picked up by natives after five days in a rubber dinghy, by which time they had already been given up for lost.

The Navy finally gave approval for Balchen's rescue plan in early January 1943, and two PBY-5As from VP-93, assigned to the Greenland Fleet Air Detachment at BW-1, and associated personnel were drafted in under the command of Lt Bernard W Dunlop. On 9 January Lt Dunlop in BuNo 7277/20 and Ens Frank J Henderson in BuNo 02953/? took off with their crews for BW-8, where they would rendezvous with Balchen's rescue party and await favourable weather.

On 25 January they flew straight across the ice cap to Bluie East 2 (also know as BE-2, Ikateq and Optimist), which was an advance base on

Lt Dunlop's PBY-5A BuNo 7277/20 of VB-126 (VP-93 prior to 1 March 1943) has its engines run up for its second 'wheels-up' take-off from the Greenland ice cap on 17 March 1943 (*NARA 342-FH-3A91-C55800AC*)

the east coast of Greenland, about 30 miles north of the village of Angmaksalik. This was to serve as the headquarters for the rescue operation, and with the PBYs came nine dogs, one sled, two drivers, a weather man, Lt Col Bernt Balchen and a four-man rescue party.

At long last a certain amount of success began to smile on the operation, and on 5 February 1943, Lt Dunlop belly-landed BuNo 7277/20 smoothly on the ice at the motor sled camp, where the aeroplane quickly became frozen down. The three stranded men were taken aboard, and after almost two hours of strenuous labour, the flying-boat was broken away from the ice by its crew, who were then hauled aboard through the waist blister as Dunlop taxied the PBY around in a circle prior to taking off. Now only the three survivors at the crash site remained to be rescued.

Since it was not possible for the PBY to land in the immediate vicinity of the wreck because of the rough terrain, a rescue party was assigned to go to the crash site and walk the survivors to a location from where the aircraft could land and take-off. From 6 to 17 February bad weather prevailed, and on the night of the 17th and well into the 18th, high winds wrought havoc on the two PBYs, breaking ailerons on both aeroplanes and further delaying operations.

As soon as this weather passed, the Army Air Force began dropping food and supplies again to the stricken airmen, and work commenced on repairing the PBYs. Then, on 17 March, Lt Dunlop again landed on the ice cap six miles from the crash site, dropping off Balchen and his three-man rescue party with the dogs and a sled, before returning to BE-2.

The following day the rescue party reached the wreck of the B-17, which was surrounded by crevasses. The terrain was so bad that camp was pitched 400 yards away, and the rescuers walked to the aeroplane roped together. The bomber was in a precarious position, and its fuselage (including the radio room), which was now full of snow, had drifted away from the crash site. The section aft of the radio room was hanging vertically by control wires in a 30-ft wide crevasse, while a second crevasse some 20 ft wide ran parallel to the wing and about four feet in front of it. It was miraculous that anyone had survived the landing.

Soon after Balchen's rescue party reached the crash site the weather closed in again, and flight operations were not possible until April. From

The crew of the two PBY-5As that took part in the ice cap rescue operation pose alongside Lt Dunlop's PBY-5A BuNo 7277/20. They are, from left to right in the back row, Ens Frank J Henderson, Lt Bernard W Dunlop, Lt Col Bernt Balchen, USAAF, Lt(jg) Nathan F Waters and AMM1c Earl E Brown. Squatting in the front row, from left to right, are possibly ARM1cs Harold A Larson and Marlin V Heffner, possibly AMM2c Norton J Richey Jnr (brother-in-law of AP1c Henry C Jenkins) and AP1c Henry C Jenkins. Missing from the photograph are AMM1c Alex Sabo of Dunlop's crew and Lt(jg) G Chatham from Henderson's crew (*Bernt Balchen photo, Library of Congress 262-135242, courtesy of Mrs Audrey S Balchen*)

20 March through to 5 April, the men stayed near the PBY's landing site, waiting for the weather to improve sufficiently to allow the flying-boat to land. Finally, on the 5th, Lt Dunlop arrived and landed his PBY for the third time on the ice cap. All hands, including dogs, were loaded aboard, but after five attempts at taking off, the starboard engine caught fire. The blaze was quickly extinguished, but the aeroplane was too badly damaged to fly. Camp was duly established and work begun on repairing the engine.

During the night, what repairs could be made were effected and the powerplant was wired together with steel straps from equipment crates. Following an unsuccessful take-off attempt the next morning, the rescue party was once again put off the aeroplane, with Lt Col Balchen electing to stay with them. The rescued men remained aboard, and this time the PBY got them off the ice, 149 days after they had crashed onto it! Of the take-off and the flight back to BE-2, Lt Dunlop wrote;

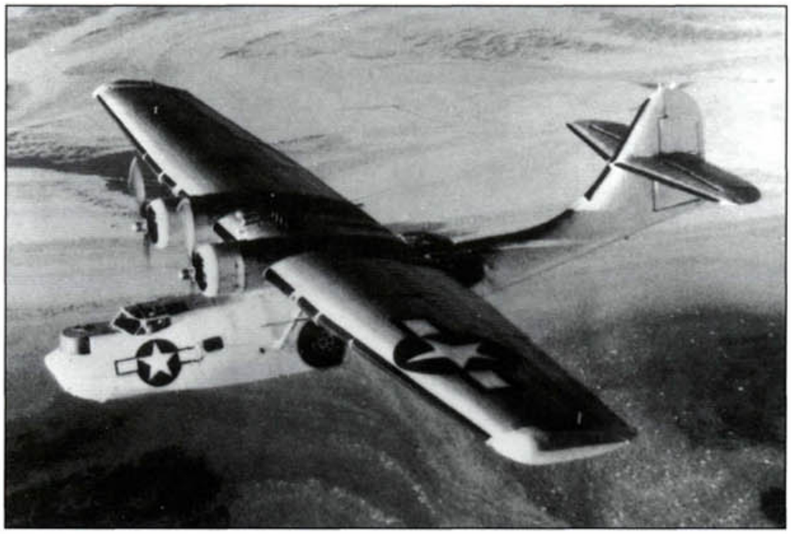
'Using the starboard engine, a take-off was made on the second attempt. On account of losing oil, and because of a lack of adequate fuel, I full-feathered the starboard engine on attaining an altitude of 1000 ft over the ice cap. The return to Optimist was made in a direct line, using one engine and losing altitude gradually. An hour-and-a-half after take-off, a landing was made at Optimist using one engine. Because of damage to the starboard motor, from which the hydraulic pump worked, the nose wheel would not descend, and since fuel was exhausted, a landing was made on the main wheels, allowing the nose to hit the runway at the end of the run.'

On 16 April Bernt Balchen and his rescue party made it to a beachhead station that had been erected specifically for the rescue effort. Here, they were picked up by Ens Frank Henderson in BuNo 02953 and flown to BE-2 two days later. On the 21st and 25th Ens Henderson made additional flights to the beachhead station to pick up its crew of Coast Guardsmen, but he could not land due to ice in the bay. Not until 18 May had the ice dissipated, allowing Henderson to land in the bay and bring the four men back to BE-2. This finally ended the most difficult and drawn out rescue ever mounted in Greenland, and possibly anywhere else in the world, which had lasted six-and-a-half months.

VP COAST GUARD-STYLE

Consistent with the US Navy's decision to withdraw from the North Atlantic, British and Canadian forces took charge of the North Atlantic convoy system, except for Greenland convoys and local Greenland-Labrador shipping, which became the responsibility of the US Coast Guard.

In June 1943 VP-93 was ordered to the Eastern Sea Frontier to re-equip with PV-1 Venturas and be redesignated VB-126. It duly left



A PBY-5A of VP-6(CG) flies over the Canadian Arctic in 1944. The unit maintained a two-aeroplane detachment in this area from Fort Chimo (Crystal 1) and Frobisher Bay (Crystal 2) during the May-October navigational season *(USCG)*

behind its Greenland and Canadian Arctic Fleet Air Detachments of five PBY-5As and three PV-1s, and these were transferred to FAW 7's Headquarter's Squadron (Hedron) control, pending the establishment and training of Coast Guard-manned patrol squadron VP-6(CG), which was to assume the duties of VP-93.

In July 1943 the US Coast Guard received orders to organise a patrol squadron of six PBY-5As for duty in Greenland, Labrador and the Canadian Arctic. One week later the first US Coast Guard personnel arrived in Argentia and a transition training programme commenced on four war-weary PBY-5As assigned from Hedron 7 – two more aircraft would subsequently be added, along with an operational spare. SNJ-4 BuNo 27010 was also assigned to the squadron's Argentia Detachment for cross-country and instrument training, as well as utility work.

On 21 August VP-6(CG) was commissioned in Argentia, and the following October the squadron shifted its headquarters to BW-1, with three of its PBY-5As arriving in Greenland on the 13th of the month. Like every other US Coast Guard unit, VP-6(CG) had to do a little of everything, but foremost on its list of priorities was the escorting of ships sailing to and from Greenland. Of particular importance were the vessels carrying cryolite from Ivigtut to the United States and Canada.

Flight operations were frequently curtailed by bad weather, and this was especially the case at BW-1, where obstructions at one end of its single runway dictated that take-offs could only be made in one direction, regardless of the direction from which the wind was blowing. Such a restriction frequently caused operations that were otherwise feasible to be cancelled simply because the wind was blowing in the wrong direction.

In order to establish how great a tailwind the PBY could take-off in, experiments were conducted that proved that the aircraft could attain flight with a full load and downwind gusts of 30-40 mph! The PBY held up all right, but such take-offs were considered too risky except in the case of a dire emergency.

For the men, life at BW-1 was dull due to the meagre nature of the base's recreational facilities. Much had been promised but little had arrived, and Army regulations were prohibitive, as VP-6(CG)'s chronicler noted. 'In effect, men can have a snowball fight (within prescribed areas), walk up and down the road viewing the awe inspiring, sierra panorama, play "acey-ducey" or suck their thumbs'.

Two PBY-5As from VP-6(CG) rest between missions at BW-1, in Greenland, in 1944 (*USCG*)

Groundcrewmen load water-filled practice bombs onto a PBY-5A from VP-6(CG) at Argentia in 1944. The twin mounds in the background were called 'Mae West' after the sex goddess, who incidentally had her roots in Newfoundland (*USNI*)

On 1 January 1944, VP-6(CG) was assigned new PBY-5As, and its establishment increased from six to nine aircraft. Apart from the aeroplanes based at BW-1, a two-aircraft detachment was usually maintained at Argentia for ice patrol and anti-submarine work. Two more PBYs were detached to the Canadian Arctic in the spring, operating from the Crystal bases at Fort Chimo (Crystal 1) and Frobisher Bay (Crystal 2). These aircraft provided ice reconnaissance and air coverage for vessels operating in Hudson Bay and off the Labrador coast, before returning at the close of the navigational season in the autumn.

From time to time squadron aircraft would also be detached to Iceland to provide coverage and support to Allied task forces operating against German efforts to establish weather bases in northeastern Greenland.

VP-6(CG) carried out searches for missing aircraft and also guided aeroplanes in distress to safety. Athough the unit never made an actual rescue, an untold number of lives were saved by its PBYs and their crews.

On one such occasion in February 1944, Lt Cdr John J McCubbin in BuNo 2470, while on a routine flight just west of Cape Farewell, happened upon the British armed trawler HMS *Strathella*. The little ship had been drifting for more than a month after being disabled in a storm by a damaged shaft bearing – it had also lost its radio at the same time – while on the North Atlantic convoy run. McCubbin contacted the cutter *Modoc*, which took the stricken trawler in tow for Greenland. *Strathella's* crew had almost died of thirst and starvation, and they related how they had gone to prayers only an hour before the PBY flew over them.

With the end of hostilities in Europe, VP-6(CG)'s operations changed from anti-submarine and convoy coverage to ice reconnaissance, utility missions and search and rescue. The unit soon reverted to a non-combat status, with all weaponry being removed from its PBYs and replaced with more suitable equipment for the squadron's current missions.

In June 1945 its establishment was reduced to six PBY-5As and one operational spare, with the excess aircraft being transferred to US Coast Guard air stations in the USA. In July VP-6(CG) was ordered back to Argentia, where it disestablished six months later.

MISSION OF MERCY

When VP-84 returned home in September 1943, it transferred PBY-5A BuNo 08095 and pilot, Lt(jg) Joseph Higbee, to the Hedron 7 Detachment in Iceland for utility and search and rescue duty.

On 29 November 1943, the US Navy was approached by the Icelandic government for help in bringing an 11-year-old girl suffering from the aftermath of measles to Reykjavik from the small fishing village of Patreksfjördur, 100 miles to the north. The girl's life depended on immediately reaching a hospital in Reykjavik.

A strong wind was already blowing when Higbee took off from the Icelandic capital, and upon reaching his destination, the sea in the fjord was an ugly grey colour from the spray being blown off the tops of 20-ft waves. The chances of landing the PBY-5A safely on water in such conditions were slim indeed.

Higbee, who had served for a number of years as an enlisted pilot, was well versed in flying all versions of the PBY, and he knew that sturdy as it was, the aircraft could never survive a landing on the sea below. But as he circled the area, his eyes caught sight of a small stretch of moderately choppy water along the shore on the leeward side of the fjord. Higbee did not hesitate, and brought the aeroplane in for a full stall landing – the kind that usually required the crew to break out its supply of sharpened pencils which were used to temporarily plug the holes created in the hull by popped rivets that had sheared off when the PBY hit the water!

Full-blooded aboriginal American, Lt(jg) Joseph Higbee (in white overalls) poses besides BuNo 08095 with members of the Hedron 7 Iceland detachment after making his heroic flight on 29 November 1943 that saved the life of an 11-year-old Icelandic girl, and earned him the highest recognition of the Icelandic people. After leaving Iceland the following month, Higbee completed a number of fixed-wing assignments, before converting to helicopters and becoming only the 39th naval aviator in the US Navy to be issued a rotary-winged licence (*US Navy via Joseph Higbee*)

Despite the strong wind, with its accompanying heavy turbulence produced by the surrounding mountains, Higbee brought the PBY in like a huge dragonfly landing on a lily pad, hitting the water without popping a single rivet. The small crowd of people that had gathered on the shore to see the young girl off breathed a sigh of relief.

To prevent the aeroplane from being blown ashore, Higbee kept it pointed into the wind with its engines running while the patient and her father were brought out to the PBY by boat. Despite the heavy sea, both boarded the aeroplane safely. Higbee then looked at the raging sea and positioned the PBY for an upwind take-off. 'I had just given the engines full power when we were hit by a huge wave that washed over the wing and engines and threatened to take us under', Higbee later recalled. 'I knew we couldn't make it, so I cut the power. How I wished then I was flying a PBY-5, rather than the much heavier PBY-5A.'

In any other circumstances, Higbee would have waited until the weather subsided, but the life of the young girl was at stake, so he decided to give it another try;

'After the first attempt, I taxied further out to sea, and timing the crest of a high wave, pushed the throttles to the stops and "rode" the waves for a downwind take-off – the roughest in my life. That was an experience I'll never forget, as I'm sure no one else will who was with me that day.'

Forty-three years would pass before Joe Higbee was properly recognised for his heroic deed when, in February 1986, he was awarded the Presidential Service Medal by Iceland's President, Madame Vigdís Finnbogadóttir, for his 'brave deed for the sake of mercy that dark and windy day so long ago'.

APPENDICES

APPENDIX I

US ATLANTIC FLEET PBY SQUADRONS OF WORLD WAR 2

The lineage and history of US Navy squadrons has been the source of confusion since the birth of naval aviation. Much of this confusion arises from a lack of a consistent policy in selecting the alpha-numeric designations for squadrons, the re-allocation of numeric designations and the constant redesignations of aviation units. Determining a squadron's lineage may seem to be simple enough, but that is not the case. A squadron may undergo many redesignations during its existence, sometimes even bearing the designation of a previous unit with which it has no lineage relation whatsoever!

In 1939, a standard system of numbering patrol squadrons was adopted, with the first digit of the squadron number indicating the wing to which the squadron was attached and the second digit the number of the squadron within the wing – e.g. VP-51 being the first squadron of PatWing 5, etc.

In 1942, patrol wings were reorganised to increase the mobility and flexibility of patrol aviation. Headquarter Squadrons (Hedrons) were authorised for each wing to furnish administrative and maintenance services, thus relieving the attached squadrons of these duties. Permanent assignment of squadrons was abolished in favour of geographical deployment as the war situation required. Their designation numbers, while remaining unchanged, would no longer be indicative of the wing to which they were attached.

On 1 March 1943, the squadron designation system was changed yet again, and Patrol Squadrons (VP) operating land-type aircraft became Bombing Squadrons (VB). The designation for seaplane and amphibian squadrons was not affected and remained VP, but only until 1 October 1944, when both VP and VB squadrons were redesignated Patrol Bombing Squadrons (VPB). On 15 May 1946, the designation of patrol bombing squadrons reverted to its pre-war practice with the change from VPB back to VP.

The following 22 PBY patrol squadrons served with the US Atlantic Fleet in World War 2. The squadrons are listed in numerical order by the designations they carried on 7 December 1941, or the time of establishment, if later.

VP-31

Established as VP-10 on 29 May 1924 in Coco Solo, in the Panama Canal Zone, the unit was redesignated VP-2D15 on 21 September 1927, which changed to VP-2S on 1 July 1931. It became VP-2F on 17 July 1933 and VP-2 on 1 October 1937 when assigned to newly-formed PatWing 3, again in Coco Solo. It received PBY-2s in 1937, was redesignated VP-31 on 1 July 1939 and assigned to Key West for Neutrality Patrol duty between 9 March and 1 April 1940. Detachments were also sent to San Juan, in Puerto Rico, and Coco Solo from 1 May 1940. Re-equipped with PBY-5s in August 1941, VP-31 was on temporary detachment to the Caribbean, with USS *Lapwing* (AVP-1) as tender, on 7 December 1941. Transferred to San Juan, it maintained detachments in Guantanamo Bay, Cuba, Antigua, Great Exuma, in the Bahamas, St Lucia, in British Guiana, and Trinidad. It was then transferred to the Eastern Sea Frontier on 30 September 1942 and re-equipped with PBY-5As. VP-31 established its HQ in Elizabeth City, North Carolina, in October 1942, with detachments in Quonset Point, on Rhode Island, Argentia, in Newfoundland, Bluie West 1 (BW-1) in Narsarssuak, Greenland, Cherry Point, in North Carolina, and Jacksonville, in Florida. The unit was reunited in Norfolk, Virginia, on 1 April 1943, redesignated as VB-105 on 15 May and re-equipped with PB4Y-1s. Redesignated VPB-105 on 1 October 1944, it disestablished on 27 June 1945.

VP-32

Established as VP-5S on 1 July 1931 in Coco Solo, this unit was transferred to San Diego, California, on 1 February 1932. Redesignated as VP-5F on 1 April 1933, it returned to Coco Solo exactly three weeks later. Becoming VP-5 on 1 October 1937 under PatWing 3 control, it eventually transferred to Norfolk in May 1938 and re-equipped with PBY-3s. Returning to Coco Solo four months later, it was redesignated VP-33 on 1 July 1939. Becoming VP-32 on 1 October 1941, the unit was still flying PBY-3s from Coco Solo when Pearl Harbor was attacked. It was transferred to the operational control of VIth Bomber Command on 3 August 1942 and tasked with patrolling the Pacific approaches to the Panama Canal. VP-32 subsequently moved from the Panama Sea Frontier to the Caribbean Sea Frontier 16 days later, after which it maintained detachments in Guantanamo Bay and Great Exuma. Re-equipped with PBM-3Cs between December 1942 and April 1943, the unit was redesignated VPB-32 on 1 October 1944. Post-war, it once again became VP-32 on 15 May 1946, before being redesignated VP-46 on 1 September 1948.

VP-33

Established on 1 April 1942 in Norfolk under PatWing 5, the unit was equipped with PBY-5As and sent to Quonset Point for shakedown training. It then reported to PatWing 3 in Coco Solo on 16 July 1942 as a replacement for VP-52. On 7 July 1943 VP-33 was detached and transferred to the Pacific Fleet, where it joined the 'Black Cat' club of PBY patrol squadrons. Redesignated VPB-33 on 1 October 1944, it disestablished on 7 April 1945.

VP-34

Established on 15 April 1942 in Norfolk under PatWing 5, this unit was equipped with PBY-5s. It reported to PatWing 3 in Coco Solo on 26 July 1942, after which it maintained detachments in Kingston, Jamaica, and Trujillo, Honduras, prior to transferring from the Panama Sea Frontier to the Caribbean Sea Frontier on 10 October 1942. VP-34 was then based in Guantanamo Bay, with detachments maintained in Great Exuma, San Juan, Antigua, Trinidad and Esquibo, in British Guiana. Detached on 7 June 1943, the unit transferred to the Pacific Fleet, where it became a 'Black Cat' squadron. Redesignated VPB-34 on 1 October 1944, it was disestablished on 7 April 1945.

VP-45

Established on 10 March 1943 in Seattle, Washington, under Fleet Air Wing (FAW) 6 control, the unit was equipped with PBY-5s. Following shakedown training on Whidbey Island, Washington, between March and April 1943, it transferred to FAW 4 in Alaska. Reformed in Seattle with PBY-5As on 14 January 1944, the unit transferred to Norfolk-based FAW 5 on 15 March 1944. Relocated to Boca Chica, in the Dominican Republic, for ASW training and patrol, VP-45 transferred to FAW 16 in Belém, Brazil, on 29 April 1944. Detachments were also maintained at Amapa, Sao Luiz and Fernando de Noronha Island, all in Brazil. Redesignated VPB-45 on 1 October 1944, the unit sent six PBYs to Ascension Island in February 1945. Transferred to Ipitanga and Bahia, in Brazil, between March and May 1945, it reported to FAW 5 in Norfolk on 27 May 1945 and disestablished nine days later.

VP-51

Established as VP-11F in North Island, San Diego, on 1 July 1936, the unit received 12 new PBY-1s later that same year and flew them to Ford Island, Hawaii, in April 1937. It turned them over to VP-8F two months later and returned to San Diego to become the first squadron to be equipped with the PBY-2. Redesignated VP-11 under newly formed PatWing 1 in San Diego, it was then transferred with VP-12 from PatWing 1 to PatWing 5 in Norfolk on

30 June 1939. Redesignated VP-54 at the same time, it sent four PBYs to Gould Island, New Hampshire, in June 1939 on Neutrality Patrol duty. Three more went sent to Bermuda in September 1940 to conduct the same mission. Redesignated VP-51 on 1 July 1941, the unit re-equipped with PBY-5s that same month. Transferred to the Pacific, it arrived in Kaneohe Bay, Hawaii, on 21 December 1941. The unit was later redesignated VB-101 and became the Navy's first combat squadron to equip with PB4Y-1 Liberators in January 1943.

VP-52

Established as torpedo squadron VT-3D15 in Coco Solo on 12 July 1928, the unit was redesignated VP-3S on 21 January 1931. It became VP-3F on 17 July 1933 and received PBY-1s in April 1937. Redesignated VP-3 on 1 October 1937, the squadron became VP-32 on 1 July 1939. It relieved VP-33 of Neutrality Patrol duty in February 1940, flying out of Guantanamo Bay, before transferring to San Juan in March 1941. Relocated to Norfolk on 1 June 1941 and re-equipped with PBY-5s, the squadron transferred to PatWing 5 and was redesignated VP-52 on 1 July 1941. It sent six PBY-5s to the Caribbean for Neutrality Patrol duties on 23 August 1941, thence to Natal, in Brazil, on 11 December 1941 – its second division detached to the Canal Zone on the latter date. The unit was reunited in Norfolk in April 1942, after which it was sent to Bermuda that same month. Detachments were then maintained in Quonset Point and Argentia, before the unit returned to Norfolk on 15 May 1943. VP-52 then transferred to the Pacific, where it became a 'Black Cat' squadron. Redesignated VPB-52 on 1 October 1944, it disestablished on 7 April 1945.

VP-53

Established on 1 May 1942 in Norfolk under PatWing 5, VP-53 was equipped with PBY-5s and assigned to the Gulf Sea Frontier. Transferred to Key West on 25 July 1942, it maintained a detachment on Grand Cayman Island. Assigned to the Caribbean Sea Frontier on 24 September 1942, the unit arrived in Trinidad on 1 October 1942. It also maintained detachments in San Juan and Esquibo (Atkinson Field). Detached on 13 July 1943 and transferred to the Pacific, the unit became VPB-53 on 1 October 1944, and was then redesignated VP-53 on 15 March 1946. It became VP-AM-1 on 15 November 1946, and operated PBY-5A/6As until disestablished on 5 May 1948.

VP-63

Established on 19 September 1942 in Alameda, California, as part of PatWing 8, this unit was equipped with PBY-5As. Subsequently designated a specialised MAD squadron and re-equipped with PBY-5s in January 1943, the unit was posted to Quonset Point on 6 April 1943. It maintained detachments in Miami and Jacksonville, as well as Bermuda, during this period. Sent to Reykjavik on 27 June 1943, VP-63 then headed further east to Pembroke Dock, in Wales, on 20-22 July 1943. Here, it came under the operational control of RAF Coastal Command's No 19 Group. Posted to Port Lyautey, in French Morocco, on 16 December 1943, the unit continued to operate a two-PBY detachment in the UK until 20 January 1944. Redesignated VPB-63 on 1 October 1944, it maintained a four-PBY detachment at Dunkeswell/ Upottery, in Devon, between 9 January and 1 June 1945. The unit detached from FAW 15 on 6 June 1945 and returned to Norfolk, where it disestablished on 2 July 1945.

VP-71

Established as VP-12F in Seattle on 1 November 1935, the unit was equipped with PBY-1s in February-March 1937. Redesignated VP-12 on 1 October 1937 as part of PatWing 1 in San Diego, the unit operated from both here and Kodiak, in Alaska, until transferred to PatWing 5 in Norfolk and redesignated VP-51 on 1 July 1939. It deployed to San Juan for Neutrality Patrol duties on 12 September 1939, after which it was assigned to Patrol Wing, Support Force on 1 March 1941 and re-equipped with PBY-5s. Detachments were then maintained in Norfolk, at Floyd Bennett Field in New York, and in Argentia. Redesignated VP-71 on 1 July 1941, the unit operated detachments in Greenland in August and October 1941. It was then transferred to the Pacific on 8 December 1941 following the attack on Pearl Harbor, arriving in Hawaii on Christmas Day. Redesignated VPB-71 on 1 October 1944, the unit duly became VP-71 on 15 May 1946. Redesignated VP-AM-3 on 15 November 1946, it became VP-33 on 1 December 1948 and disestablished on 15 December 1949.

VP-72

Established as VP-14F on 1 November 1935 in Norfolk, the unit was redesignated VP-14 on 4 September 1937 as part of PatWing 5, again in Norfolk. It became VP-52 on 1 July 1939 and moved to Charleston, in South Carolina, exactly three months later. Operating from advance bases on Parris Island and in Wyniah Bay, South Carolina, between August and October 1940, the unit began receiving PBY-5s near year-end. Posted back to Norfolk on 1 January 1941, the squadron moved to San Juan a month later, and was assigned to Patrol Wing, Support Force on 1 March 1941. It then transferred to Quonset Point on 5 April 1941 and to Argentia on 15 May 1941. From here it maintained a detachment to Reykjavik between 29 May and 8 June 1941. Redesignated VP-72 on 1 July 1941, it operated a second detachment from Reykjavik between 4-17 July 1941. VP-72 was transferred to the Pacific on 8 December 1941. Redesignated VPB-122 on 1 October 1944, it was re-equipped with PB4Y-2s. The unit became VP-122 on 15 May 1946, was redesignated VP-HL-12 on 15 November that same year and became VP-29 on 1 September 1948. It was disestablished on 18 January 1950.

VP-73

Established as VP-15F on 1 September 1936 in Annapolis, Maryland, this unit alternated between here (summer) and Norfolk (winter) through to 1939. It had been redesignated VP-15 in Norfolk on 1 October 1937 under PatWing 5 control, before becoming VP-53 on 1 July 1939. The unit received a mixed bag of PBY-1/2/3s in October-November 1939, after which it was posted to Key West in February 1940. Returning to Norfolk in April 1941, VP-53 was re-equipped with PBY-5s and assigned to Patrol Wing, Support Force on 5 April 1941. Sent to Quonset Point on 24 May 1941, it also maintained a six-aeroplane detachment in Argentia between 9-25 June 1941. Redesignated VP-73 on 1 July 1941, the squadron sent a six-aeroplane detachment to Reykjavik on 9 August 1941. Re-equipped with PBY-5As in January 1942, the unit was reunited in Reykjavik in May 1942. Detached from Iceland on 30 October 1942, the squadron arrived in Port Lyautey on 13 November 1942. It was posted to Agadir, again in French Morocco, on 16 August 1943, before returning to Norfolk on 28 December 1943. Assigned to the Eastern Sea Frontier on 10 January 1944, VP-73 was based at Floyd Bennett Field from 16 January 1944 through to 30 May 1945. It maintained detachments in Norfolk in January-February 1944 and Beaufort, in South Carolina, between 17-30 April 1944. Redesignated VPB-73 on 1 October 1944, the unit received several PBY-6As in December 1945. It maintained detachments at Quonset Point between December 1944 and February 1945. Posted to San Juan on 30 May 1945, it also had a three-aeroplane detachment in Port Lyautey from 1 June 1945 and one-aeroplane flight in Guantanamo Bay. Redesignated VP-73 on 15 May 1946, the unit returned to Norfolk six months later. Redesignated VP-AM-4 on 15 November 1946, it became VP-34 on 1 September 1948 and commenced converting to PBM-5s. The unit disestablished on 30 June 1956.

VP-81

Established as VP-19 on 1 October 1937 in Seattle under PatWing 4 control, this unit was redesignated VP-43 on 1 July 1939. It received PBY-5s in May 1941 and transferred to Norfolk to join the Atlantic Fleet's PatWing 8 on 13 June 1941. Redesignated VP-81 on 1 July 1941, the unit was assigned additional duty as the Operational Training Unit for all Atlantic Fleet patrol squadrons on 22 October 1941 and relocated to Key West. One division reported to PatWing 3 in the Canal Zone on 12 December 1941, whilst another division was assigned to the Gulf Sea Frontier and based in Key West in April-May 1942. The PatWing 3 division returned to Key West on 19 August 1942, after which it was posted to San Juan 12 days later – here, it came under PatWing 12 control. A three-aeroplane detachment was also maintained at Grand Cayman. The unit was transferred to Trinidad on 18 December 1942 and assigned temporary duty to the Eastern Sea Frontier the following month. Relocated to Guantanamo Bay on 1 June 1943 under FAW 11 control, VP-81 transferred to the Pacific Fleet on 1 August 1943, where it became a 'Black Cat' squadron. Redesignated VBP-121 on 1 October 1944 and re-equipped with PB4Y-1/PB4Y-2s, it disestablished on 1 June 1946

VP-82

Established as VP-20 on 1 September 1938 in Seattle, under PatWing 4 control, this unit was redesignated VP-44 on 1 July 1940 and became VP-61 on 6 January 1941. Transferred to Norfolk five months later, it received PBY-5s. Redesignated VP-82 on 1 July 1941 under PatWing 8 control, the unit deployed to Floyd Bennett Field on 15 August 1941, before returning to Norfolk on 15 October 1941 and commencing re-equipment with PBO-1s – it duly became the US Navy's first landplane patrol unit. Posted to Argentia in January 1942, it was sent to Quonset Point on 28 May 1942, where it received several PBY-5As for patrol duties. Redesignated VB-125 on 1 March 1943, it became VPB-125 on 1 October 1944 and eventually disestablished on 8 June 1945.

VP-83

Established on 15 September 1941 in Norfolk under PatWing 8 control, half of VP-83's personnel were assigned temporary duty as the transition training squadron for the Pacific Fleet in the wake of the Pearl Harbor attack until the unit received its full complement of 12 PBY-5As in January 1942. Shakedown training was undertaken in Norfolk between January and March 1942, after which its first division of six PBY-5As arrived in Natal on 7 April 1942. A second division of six PBY-5As commenced temporary duties from Norfolk on 10 April 1942, with detachments also being maintained in Banana River and Jacksonville, in Florida, and Charleston under Eastern Sea Frontier Command. The second division transferred to Natal to join the first division on 13 June 1942. The unit returned to Norfolk and reformed on 15 May 1943 as VB-107, equipped with PB4Y-1s. It was then sent back to Brazil in June 1943. Redesignated VPB-107 on 1 October 1944, the unit became VP-107 on 15 May 1946. Redesignated VP-HL-7 on 15 November 1946, it became VP-27 on 1 September 1948 and disestablished on 11 January 1950.

VP-84

Established on 1 October 1941 in Norfolk as part of PatWing 8, this unit also supplied personnel to the transition training squadron for the Pacific Fleet after Pearl Harbor. These sailors returned when it received 12 PBY-5As in January 1942. Following shakedown training in Alameda between January and April 1941, the unit was sent to Norfolk on 12 April 1941 and assigned to the Eastern Sea Frontier. It sent detachments to Charleston on 12 May 1942, Argentia, under PatWing 7 control, on 1 June 1942, Beaufort in September 1943, Reykjavik in October 1943 and Quonset Point on 18 December 1943. VP-84 reported to FAW 3 in Coco Solo on 16 May 1944. It maintained PBYs in Barranquilla, Colombia, during this time too. Redesignated VPB-84 on 1 October 1944, the squadron flew from Quonset Point between 11 November 1944 and 12 January 1945, less Detachment One, which remained in Coco Solo until detached on 7 April 1945 to Alameda. VPB-84 was disestablished on 28 June 1945

VP-92

Established on 26 December 1941 in Alameda as part of PatWing 9 and equipped with PBY-5As, VP-92 deployed to San Juan on 10 March 1942. It maintained detachments in Guantanamo Bay, Antigua and Camaguey, in Cuba during this period. Transferred from San Juan to Guantanamo Bay on 5 July 1942, VP-92 left two PBYs at San Juan for ASR. It transferred to Trinidad on 10 September 1942, with a detachment also being maintained in Great Exuma. The unit deployed to Casablanca, in French Morocco, on 13 November 1942, followed by a move to Port Lyautey on 10 March 1943. A detachment was also maintained in Agadir from 5 December 1943. Transferred to the Caribbean Sea Frontier on 10 March 1944, the unit was based at Zandery Field, in Dutch Guiana. From here, its aircraft were also sent to Hato Field, in Curacao. Detachments were maintained in Trinidad and San Juan as well. VP-92 moved in its entirety to San Juan on 14 May 1944, with a detachment maintained at Curacao. It moved to the latter site on 9 July 1944, with a detachment maintained at San Juan. Redesignated VPB-92 on 1 October 1944, the unit transferred to San Juan on 29 November 1944, with a detachment maintained in Curacao. Transferred to Quonset Point on 7 January 1945, the squadron moved to Norfolk on 24 May 1945 and disestablished four days later.

VP-93

Established on 5 January 1942 in Norfolk under PatWing 9 control, the unit was equipped with PBY-5As. It moved to Quonset Point on 5 April 1942, then to Argentia on 12 May 1942. Detachments were also maintained at BW-1 and BW-8. Re-equipped with PV-3s (traded for PV-1s) in December 1942, the unit kept a flight of three PBY-5As for utility work in Greenland. Redesignated VB-126 on 1 March 1943, the squadron maintained a detachment in the Canadian Arctic until the unit was transferred to the Eastern Sea Frontier on 17 June 1943. Redesignated VPB-126 on 1 October 1944, it disestablished on 27 June 1945.

VP-94

Established on 3 March 1942 in Norfolk under PatWing 9 control, the unit was equipped with PBY-5As and assigned to the Eastern Sea Frontier. It transferred to Quonset Point upon becoming operational on 31 May 1942, maintaining detachments in Quonset Point, Cherry Point, Charleston and Jacksonville. It then transferred to Natal on 18 January 1943, and flew detachments from Belém, Rio de Janeiro, Fortaleza, Recife, São Luiz and on Fernando de Noronha Island, as well as in Trinidad and at Zandery Field. VP-94's HQ moved to Maceio, in Brazil, on 29 April 1944, and it then transferred to nearby Ipatanga. From here it controlled detachments operating from Maceio, Fernando de Noronha Island, Ipitanga and Caravellas. A five-PBY detachment was sent to Santa Cruz on 10 August 1944 to initiate the USBATU (United States Brazilian Aviation Training Unit). Redesignated VPB-94 on 1 October 1944, the squadron transferred its 15 PBY-5As to the *Força Aérea Brasileira* on 12 December 1944. Returning to Norfolk three days later, the unit was disestablished on 22 December 1944.

VP-6(Coast Guard)

Established on 21 August 1943 in Argentia under FAW 7 control, this unit was manned by US Coast Guard (USCG) personnel and equipped with PBY-5As. Following transitional training in Argentia between August and October 1943, the unit was posted to BW-1 on 8 October 1943 for operations as part of the Greenland Patrol. Detachments were maintained in Argentia, in the Canadian Arctic and Reykjavik. Redesignated VPB-6(CG) on 1 October 1944, the squadron's control was transferred to the Commandant USCG on 12 July 1945. Sent to Argentia the following month, VPB-6(CG) was disestablished in January 1946.

VFP-1 (6 FE)

Established on 15 September 1943 in Norfolk under FAW 5, the unit was manned by Free French personnel and equipped with lend-lease PBY-5As. The unit was known as *1st escadrille des forces navales françaises libres*, which became 6 FE after merging Free French and ex-Vichy French personnel in North Africa. Reporting to FAW 15 at Port Lyautey from 18 February 1944, it transferred to Agadir five days later. Detachments were maintained in Ajaccio, in Corsica, and on Malta. The squadron converted to PV-1 Venturas on 16 November 1944 and was redesignated VFPB-1, after which it became *Flottille 6F* on 1 January 1946.

VFP-2 (8 FE)

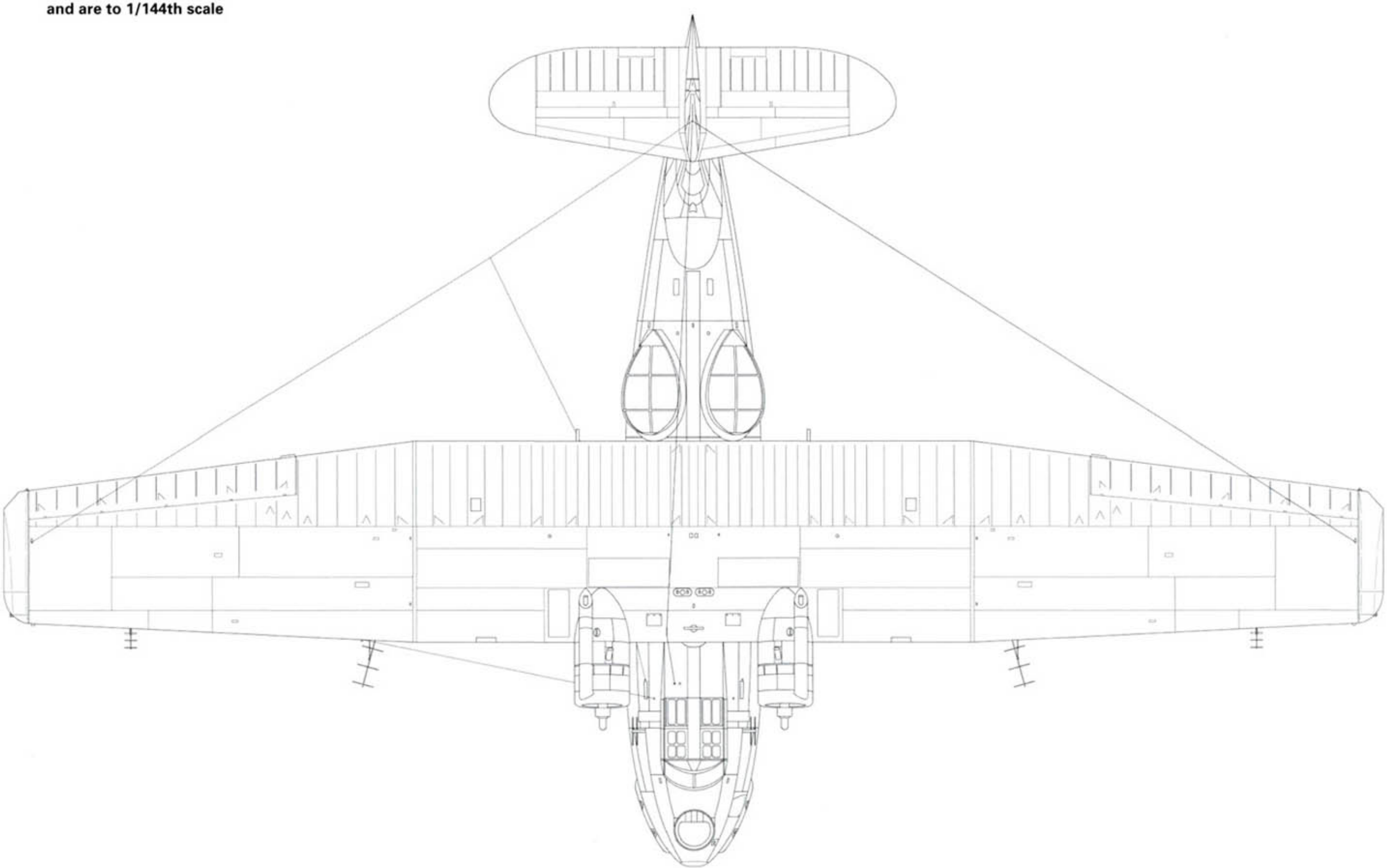
Established on 1 July 1944 in Norfolk under FAW 5 control, this unit was manned by ex-Vichy French personnel and equipped with PBY-5As provided under lend-lease. Operating from Agadir between 25 September and 25 November 1944, the unit had detachments in Ajaccio, Cuers, in France, and Grottaglie, in Italy. The unit moved to Port Lyautey in January 1944, then to Agadir after VE-Day. It then transferred to French Naval Air Arm control and became *Flottille 8F* on 1 January 1946, when it was posted to French Indochina (Vietnam).

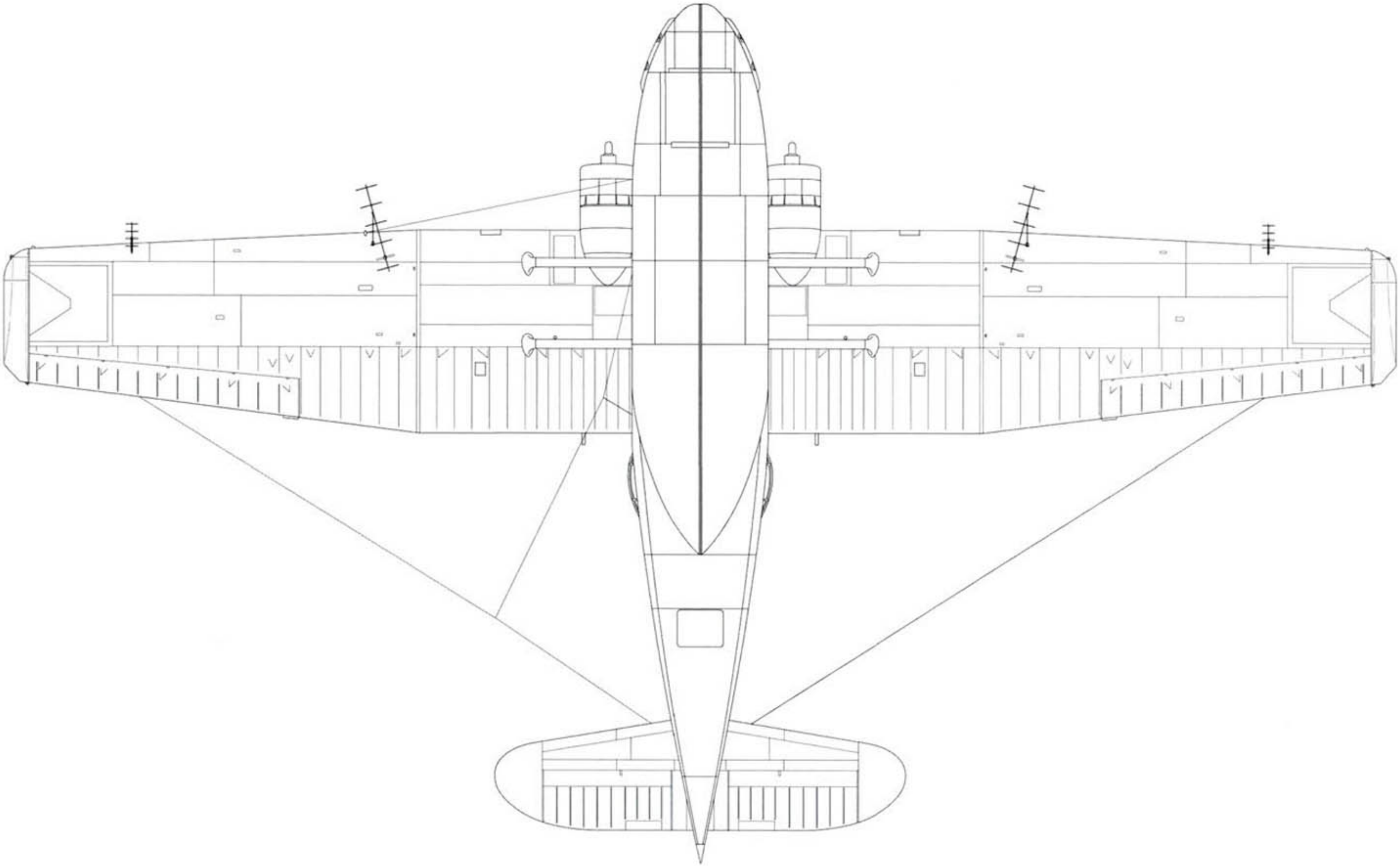
APPENDIX II

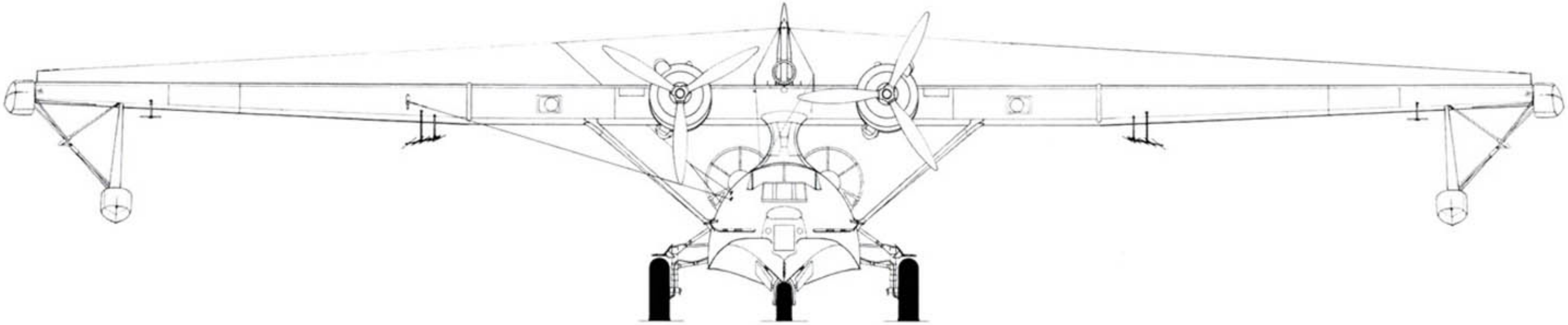
SUBMARINES SUNK BY ATLANTIC FLEET PBYs

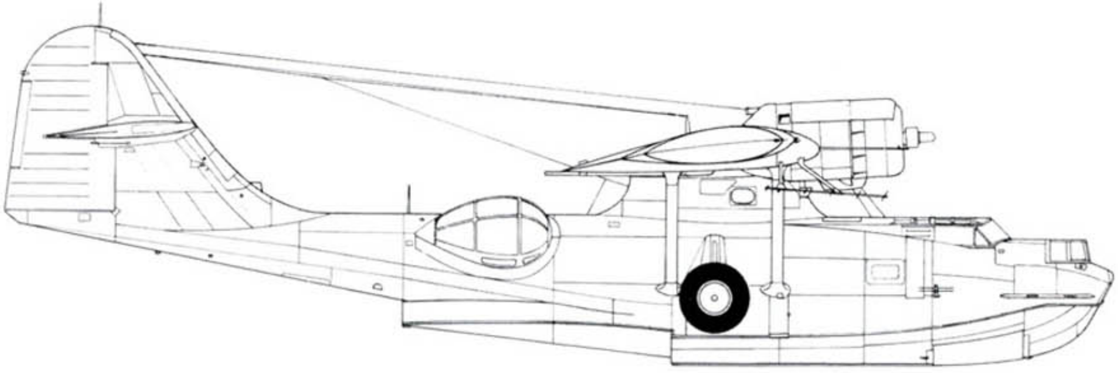
DATE	SUBMARINE	UNIT/Base	Model	BuNo/Side Number	Pilot	NOTES
20/8/42	U-464	VP-73 /Reykjavik	PBY-5A	2459/9	Lt(jg) R B Hopgood	
28/8/42	U-94	VP-92 /Guantanamo Bay	PBY-5A	7295/6	Lt G E Fiss	Shared with HMCS *Oakville*
5/10/42	U-582	VP-73 /Reykjavik	PBY-5A	2459/9	CAP M Luke	
5/11/42	U-408	VP-84 /Reykjavik	PBY-5A	7273/8	Lt R C Millard	
13/11/42	*Le Conquérant* (Vichy French)	VP-92/in transit	PBY-5A PBY-5A	7274/4 7256/5	Lt H S Blake Lt(jg) R E Seamans	
6/1/43	U-164	VP-83/Belém	PBY-5A	7263/2	Lt(jg) W R Ford	
13/1/43	U-507	VP-83/Fortaleza	PBY-5A	08099?/10	Lt(jg) L Ludwig	BuNo probably 08099
8/3/43	U-156	VP-53/Trinidad	PBY-5	04480/1	Lt(jg) J E Dryden	
15/4/43	*Archimede* (Italian)	VP-83/Natal VP-83/Natal	PBY-5A PBY-5A	2472/5 08039/12	Ens T E Robertson Lt G Bradford	
14/5/43	U-640	VP-84/Reykjavik	PBY-5A	2457/11	Lt(jg) P A Bodinet	
25/5/43	U-467	VP-84/Reykjavik	PBY-5A	2467/6	Lt R C Millard	
20/6/43	U-388	VP-84/Reykjavik	PBY-5A	08037/9	Lt E W Wood	
24/6/43	U-194	VP-84/Reykjavik	PBY-5A	2459/7	Lt(jg) J W Beach	
9/7/43	U-590	VP-94/Belém	PBY-5A	02955/1	Lt(jg) S E Auslander	
15/7/43	U-135	VP-92/Agadir	PBY-5A	7295/6	Lt(jg) R J Finnie	Shared with HMS *Rochester*, *Mignonette* and *Balsam*
21/7/43	U-662	VP-94/Belém	PBY-5A	02964/4	Lt(jg) R H Rowland	
24/2/44	U-761	VP-63/Port Lyautey VP-63/Port Lyautey	PBY-5 PBY-5	08245/15 08437/14	Lt(jg) T R Woolley Lt(jg) H J Baker	Shared with an RAF Catalina, USN PV-1 and HMS *Wishart* and *Anthony*
16/3/44	U-392	VP-63/Port Lyautey VP-63/Port Lyautey VP-63/Port Lyautey	PBY-5 PBY-5 PBY-5	08154/8 08176/1 08149/7	Lt R C Spears Lt(jg) V A T Lingle Lt(jg) M J Vopatek	Shared with HMS *Affleck*
15/5/44	U-731	VP-63/Port Lyautey VP-63/Port Lyautey	PBY-5 PBY-5	08439/12 08176/1	Lt(jg) M J Vopatek Lt H L Worrell	Shared with HMS *Kilmarnock* and HMT *Blackfly*
30/4/45	U-1107	VPB-63/Dunkeswell	PBY-5A	48318/R	Lt F G Lake	

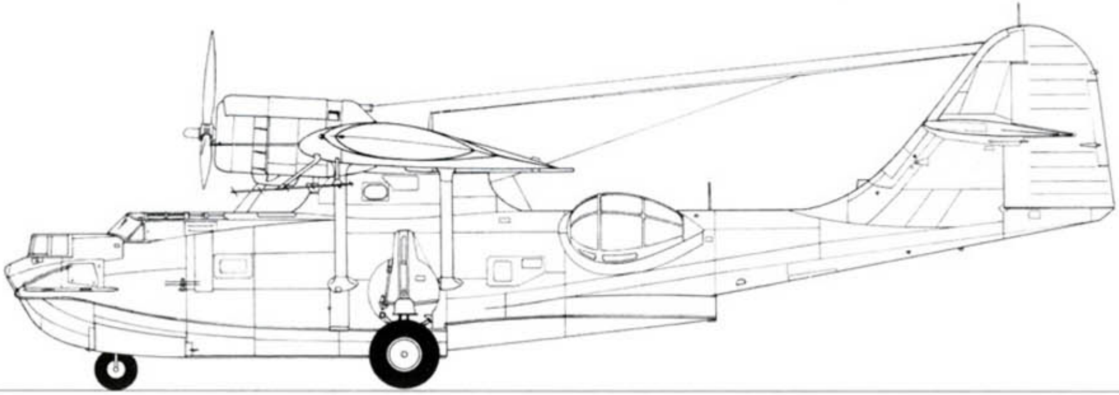
All scale drawings are of a Consolidated PBY-5A
and are to 1/144th scale











COLOUR PLATES

1

PBY-1 BuNo 0130 of VP-51, San Juan, Puerto Rico, October 1939

Shown here shortly after arriving in San Juan for Neutrality Patrol duty, BuNo 0130 wears the standard pre-war aluminium finish with an asphalt-base black hull and float bottoms. The aeroplane sports VP-51's solid red rudder and elevators and, being the third PBY of the squadron's 2nd Section, has a white wing chevron and lower half to its engine cowl rings. In March 1941, BuNo 0130 transferred to the Hawaiian detachment of VJ-2, and was one of only a handful of PBYs to survive the Japanese attack. In August 1942 it returned to USA and was assigned to training duties at NAS Corpus Christi, in Texas, where it remained until stricken on 13 March 1944.

2

PBY-2 BuNo 0457 of VP-54, Gould Island (Newport, Rhode Island), 1939-41

BuNo 0457 was one of four PBY-2s from VP-54 sent to Gould Island to carry out neutrality patrols between Newport and Nova Scotia following the outbreak of the war in Europe. It is seen here in a modified pre-war finish of overall aluminium paint, with a black waterline stripe having replaced the black bottom. It is wearing VP-54's solid black rudder and elevators, as well as its 3rd Section true blue wing chevron and lower half to its engine cowl rings. This particular PBY-2 is unusual in that it has de-icing boots installed on its wings and empennage – a modification possibly limited to aeroplanes engaged in cold weather operations from Gould Island. Also unusual are the semi-gloss black propeller spinners, which was a feature common only to the later PBY-4 model. On 1 July 1941 VP-54 was redesignated VP-51 and re-equipped with PBY-5s, the unit in turn sending its PBY-2s to NAS Pensacola, Florida, for training duty. In that capacity, BuNo 0457 served with training squadron VN8D8-A until stricken from the Navy's inventory on 31 December 1944.

3

PBY-2 BuNo 0469 of VP-31, San Juan, Puerto Rico, October 1940

BuNo 0469 was one of three PBY-2s from VP-31 detached from Coco Solo to San Juan for Neutrality Patrol duty in May 1940. Seen here at San Juan in the same modified pre-war colour scheme as worn by '54-P-9' (see the previous profile), it has the single red horizontal rudder and elevator stripes synonymous with VP-31. Being the 2nd Section's leading aeroplane, the PBY also has a white wing chevron, full circle white engine cowl rings and a white section leader band on the rear hull. When VP-31 re-equipped with PBY-5s in the summer of 1941, it turned its old PBY-2s over for training duties at NAS Jacksonville. In January 1943 BuNo 0469 was transferred to Pensacola, where it served with training squadrons VN8D8-A and VN8D8-B until stricken on 30 September 1944.

4

PBY-3 BuNo 0884 of VP-5, Coco Solo, Panama Canal Zone, 1938-39

In the summer of 1938, VP-5 re-equipped with new PBY-3s. On 1 July 1939 the unit was redesignated VP-33, and BuNo 0884 became '33-P-1'. Two months later VP-33 was assigned Neutrality Patrol duties in the Caribbean, and on 1 October 1941 it became VP-32. When the United States entered the war, VP-32 was based at Coco Solo, from where it patrolled the Pacific approaches to the Panama Canal until August 1942 when it switched to the Caribbean Sea Frontier for operations from Guantanamo Bay. It was here, on 24 September 1942, that BuNo 0884 was damaged beyond repair when it ran onto the beach in Guantanamo Bay during a take-off run and was written off.

5

PBY-3 BuNo 0888 of VP-33, Coco Solo, Panama Canal Zone, 1939-41

BuNo 0888 enjoyed much the same history with VP-5/33/32 as BuNo 0884, except that its service life was considerably longer. When VP-32 started re-equipment with Martin PBMs in December 1942, BuNo 0888 transferred to NAS Corpus Christi, in Texas, where it served with intermediate training squadron VN18D8-B until stricken on 31 December 1944. In this profile, the aeroplane exhibits signs of extensive repainting and touching up with aluminum paint. Note that the original squadron insignia on the bow has also been painted over, but not well enough to completely cover all the details of the earlier 'Wings over Panama' insignia, having been replaced by the modified insignia adopted when the unit was renamed VP-33 and placed aft of the rear wing strut. Also visible is a painted-out area denoting where the '5' from the previous unit designation (VP-5) had been replaced with a '3'. Unusually, the wing floats are no longer black below the waterline. Note the white efficiency 'E' on the bow.

6

PBY-5 BuNo 2292 of VP-52, Norfolk, Virginia, spring 1941

VP-52 was the first Atlantic Fleet patrol squadron to receive the PBY-5, BuNo 2292 being one of several diverted from San Diego-based VP-14 in January 1941. In order to expedite operations at a time when additional patrol aeroplanes were urgently required for an ever expanding Neutrality Patrol, these PBYs retained their VP-14 colours and markings, as seen here, except for a change in the squadron number. When VP-52 upgraded to later model PBY-5s, BuNo 2292 passed through VP-43 and VP-81, prior to reaching VP-51, which was working out of Norfolk and Bermuda. Following the attack on Pearl Harbor, VP-51 was ordered to join the Pacific Fleet. Upon reaching Hawaii, it transferred all of its PBY-5s to VP-22, which in turn took the aircraft to the Dutch East Indies. Of VP-22's 12 PBY-5s, BuNo 2292 was the sole survivor of the East Indies campaign to escape to Australia, where it joined VP-101. After returning to the USA in February 1943, BuNo 2292 was assigned to operational training with VPB-201 at NAS Jacksonville. When PBY operational training was discontinued at the base in November 1944, BuNo 2292 joined the PBY pool in Pensacola, before being placed in storage at Ellyson Field, in Florida. It was duly stricken here on 30 June 1946.

7

PBY-5 BuNo 2301 of VP-52, Norfolk, Virginia, March 1941

BuNo 2301 was also one of the 12 PBY-5s assigned to VP-52 in January 1941. It is seen here in appropriate unit markings, although the true blue section colour has not yet been applied to the upper half of the engine cowl rings. Like BuNo 2292 (see profile 6), this aircraft was subsequently assigned to VP-43, VP-81 and thence VP-51, before being flown to Hawaii following the attack on Pearl Harbor, where it transferred to VP-22. The PBY was damaged beyond repair in a Japanese raid on Ambon, Netherlands East Indies, four days after arriving there on 11 January 1942.

8

PBY-5 BuNo 2300 of VP-73, Reykjavik, Iceland, August 1941

BuNo 2300 was one of six PBY-5s from VP-73's 2nd Division that arrived in Reykjavik on 9 August 1941 in order to establish the Iceland Fleet Air Detachment. When VP-73 converted to PBY-5As in January 1942, BuNo 2300 was assigned to VP-81, and shortly thereafter to VP-31, operating in the Caribbean. When VP-31 traded its PBY-5s for PBY-5As in September 1941, BuNo 2300 was one of six aeroplanes transferred to VP-53 in Trinidad, where it became '53-P-12'. The unit was ordered to the Pacific in July 1943, and just prior to its departure it flew its PBYs to Corpus Christi to become trainers. BuNo 2300 was later transferred to Pensacola, where it served with VN8D8-A until stricken on 31 December 1945.

9

PBY-5 BuNo 2373 of VP-52, Norfolk, Virginia, summer 1941

BuNo 2373 was transferred from VP-51 to VP-52 in July 1941, and the following month it was detached to the Caribbean with the unit's 1st Division. When the Japanese attacked Pearl Harbor, the division was en route to Natal, arriving there on 11 December 1941. Based on the Potengi River, the division carried out anti-shipping and submarine patrols off the Brazilian coast until April 1942, when it was relieved by VP-83. Upon its return to Norfolk, BuNo 2373 detached to Bermuda on 24 May 1942. When VP-52 was posted to the Pacific in May 1943, BuNo 2373 was flown to Pensacola and relegated to training duties until retired in March 1946. The PBY was stricken from the Navy's inventory on 31 July 1946.

10

PBY-5 BuNo 2306 of VP-51, Norfolk, Virginia, summer 1941

BuNo 2306 was one of 12 second-hand PBY-5s issued to VP-51 when the squadron reformed in Norfolk in July 1941. Following the attack on Pearl Harbor, the unit was ordered to Hawaii, where it turned its aeroplanes over to VP-22. On 19 February 1942 BuNo 2306 was shot down by a Japanese carrier-based A6M Zero-sen whilst patrolling the Timor Sea off the northern coast of Australia. The crew escaped, but a sailor was killed when the rescue boat was strafed. The PBY's pilot on this flight was Lt Thomas H Moorer, later Admiral, Chief of Naval Operations and Chairman of the Joint Chiefs of Staff.

11

PBY-5A BuNo 2456, of VP-73, Reykjavik, Iceland, April/May 1942

The first production PBY-5A amphibian built, BuNo 2456 was one of 12 assigned to VP-73 in January 1942 – the unit arrived in Iceland that same month. It is shown here before the side number 7 was painted on its hull. On 18 August 1942, BuNo 2456 was struck by a P-39 Airacobra whose undercarriage had collapsed on landing. The PBY was flown out to Quonset Point the following month so that repairs could be made. In December 1942, following a brief assignment to VP-93, BuNo 2456 joined a three-aeroplane detachment from VP-52 that was operating from Portland Municipal Airport, in Maine. This duty ended in February 1943, and the detachment duly transferred to Argentia and shortly thereafter merged with a VP-31 detachment already there. When this unit dissolved in April 1943, its PBYs transferred to Hedron 7. Two months later BuNo 2456 was one of six war-weary PBY-5As that were transferred to the USAAF to form its first ever rescue unit – the Mediterranean-based XII Fighter Command Catalina Air Sea Rescue Detachment of the Twelfth Air Force. Redesignated an OA-10, given the USAAF serial number 42-109023 and nicknamed *The Ugly Duckling*, the aircraft arrived in Sidi Ahmed (Bizerte), Tunisia, on 13 August 1943. Ten days later, while providing rescue coverage over the Bay of Salerno, off the Italian coast, 42-109023 was jumped by eight German Bf 109Gs. It was downed with the loss of its entire six-man crew and one observer by Oberleutnant Franz Schiess of 8./JG 53 for his 61st kill.

12

PBY-5A BuNo 2459 of VP-73, Reykjavik, Iceland, summer 1942

Like BuNo 2456, BuNo 2459 arrived in Iceland for service with VP-73 in January 1942, being assigned the side number '9'. The history of this unique aircraft is covered in the main text of this book, so suffice to say that it finished the war as the top-scoring Allied anti-submarine bomber of any type with three German U-boats sunk and one severely damaged to its credit. Currently based in Holland with the Stichting Neptune Association, it has recently been restored to airworthiness.

13

PBY-5A (BuNo unknown) of VP-31, Norfolk, Virginia, autumn 1942

In September 1942 VP-52 transferred from the Caribbean to Norfolk, where it re-equipped with new PBY-5A amphibians. One of the aircraft taken on charge was assigned the side number '31P8', although its BuNo is not on record. On 30 September 1942, VP-31 was assigned to the Eastern Sea Frontier Command, setting up its HQ in Elizabeth City, North Carolina. Over the next seven months VP-31 deployed detachments to Jacksonville and Bluie West 1 (Narsarsuak). In April 1943 the unit turned in its PBYs, and the following month it emerged as VB-103 – the first Atlantic Fleet squadron equipped with PB4Y-1s.

14

PBY-5A BuNo 02972 of VP-93, Bluie West 8, Greenland, July 1942

BuNo 02972 was one of 12 new PBY-5As assigned to newly-formed VP-93 in April 1942. The following month the unit deployed a three-aeroplane detachment to Bluie West 8, led by Lt Aram Y 'Dick' Parunak. On 30 July 1942, Lt Parunak, in BuNo 2972/4, became the first pilot to land and take off from the Greenland ice cap when he led the rescue of the crew of the downed USAAF B-17E *My Gal Sal* – another rescue under similar circumstances was accomplished later in the month. After VP-93 re-equipped with PV-1s and was redesignated VB-126, BuNo 02972 was flown to Iceland on 18 March 1943 as a replacement PBY for VP-84. It returned with the unit to Quonset Point six months later, and made its last flight with VP-84 from NAS Beaufort in October 1943. Following overhaul, BuNo 02972 was flown across the Atlantic in March 1944 and assigned to the Hedron Utility Unit of Fleet Air Wing 15 at Port Lyautey. In October 1945, BuNo 02972 was assigned to Commander Naval Forces, Azores, and it is here that it was stricken on 31 October 1946.

15

PBY-5A BuNo 7277 of VB-126, Bluie East 2, Greenland, March 1943

Assigned new to VP-84 in January 1942, BuNo 7277 was one of five PBY-5As turned over by the squadron to VP-93 when it went to Iceland in October 1942. In December 1942 VP-93 duly re-equipped with PV-3s (shortly exchanged for PV-1s), although it retained three PBY-5As for utility work. In January 1943 BuNo 7277 was one of two PBY-5As detached to Bluie East 2 (Ikateq) on Greenland's east coast in an attempt to rescue the crew of a downed B-17 on the ice cap. Between 5 February and 6 April 1943, Lt Bernard W Dunlop made three unprecedented 'wheels-up' landings and take-offs on the ice cap in this PBY, thus bringing to an end what has to be one of the most remarkable aerial rescue efforts in history. BuNo 7277 is seen here in the overall glossy insignia white camouflage scheme approved for PatWing 7 anti-submarine aircraft in September 1942. Following a seven-month assignment to VP-84 from October 1943, BuNo 7277 embarked on a training career, initially at Pensacola and later with the Air Bomber Training Unit at NAS Banana River, in Florida, until stricken on 30 March 1946.

16

PBY-5A BuNo 2466 of VP-73, Port Lyautey, French Morocco, March 1943

BuNo 2466 was one of the initial 12 PBY-5As issued to VP-73 in December 1941, being assigned the side number '1'. On 30 March 1942 it was involved in an accident whilst taxiing at NAS Quonset Point, which in turn meant that it did not make it to Iceland with the rest of the squadron two months later. In October 1942 it was flown to Iceland by VP-84 and transferred to VP-73, whence it was assigned the side number '4'. In November 1942 the PBY went with the squadron to French Morocco on the heels of the *Torch* landings. Based at Port Lyautey, it is depicted here wearing the yellow *Torch* border to its national insignia, applied to all aircraft participating in the North African landings. On 27 March 1943, BuNo 2466 was involved in a landing accident at Port Lyautey. Once repaired, it returned to the USA in December 1943 and eventually found its way into training at Corpus Christi and Banana River, before being stricken on 31 January 1947.

17

PBY-5A BuNo 2457 of VP-84, Reykjavik, Iceland, summer 1943

When VP-84 arrived in Iceland in October, it turned seven of its aeroplanes over to North Africa-bound VP-73 in return for an identical number of war-weary PBY-5As. Amongst the latter was BuNo 2457, which was assigned the side number '11' by VP-84. This aeroplane enjoyed a remarkable career with both units, attacking enemy submarines on no less than ten occasions, sinking one (U-640) and damaging another so badly that it was forced to return home for repairs (U-254). BuNo 2457 was also one of the two PBYs that VP-84 fitted with experimental twin 0.50-cal bow turrets. Returning home with VP-84 in September 1943, the PBY spent time with several Hedrons, before being assigned Coast Guard Air Station Brooklyn in 1945. Given back to the Navy in June 1946, it was stricken at Pensacola on 31 August 1946.

18

PBY-5A BuNo 7263 of VP-83, Natal, Brazil, January 1943

BuNo 7263 was the second PBY in VP-83 to carry the side number '83P2', being a replacement for

BuNo 2469, which had crashed on 26 February 1942. By June 1942 the whole squadron was operating from Natal, and on 6 January 1943 Lt(jg) William R Ford and crew sank U-164 while flying BuNo 7263. In May 1943 VP-83 returned to Norfolk and swapped its PBYs for PB4Y-1, becoming VB-107 in the process. Two months later, BuNo 7263 was back in Brazil, now as a replacement aircraft for VP-94. In June 1945 the PBY transferred to the Coast Guard and was assigned to the Coast Guard Air Station at Salem, in Massachusetts. It was returned to the Navy in 1946 and stricken at Pensacola on 30 April that same year.

19

PBY-5 BuNo 08245 of VP-63, Pembroke Dock, Wales, UK, autumn 1943

US Navy aircraft operating from the United Kingdom under the operational control of RAF Coastal Command had their Navy-style side numbers replaced by letters of the alphabet, as was the custom with RAF aircraft. Seen here in its overall glossy white colour scheme as worn whilst based at Pembroke Dock, in Wales, in the autumn of 1943, BuNo 08245's side number '15' has been replaced by the letter 'O', which is the 15th letter in the English alphabet. The number '15' displayed under the port wing was retained, however, as well as being repeated in small digits on the rear hull. On 24 February 1944, BuNo 08245, now back under Navy operational command at Port Lyautey, and having reclaimed its hull number '15', shared in the location and subsequent attack on U-761 – the first U-boat to be located by MAD and then sunk. After VE-Day, BuNo 08245 briefly served in Pensacola with a training unit before being placed in storage at Renton (Seattle), Washington, in November 1946. It sat here for nearly three years before being stricken on 30 June 1949.

20

PBY-5 BuNo 08437 of VP-63, Port Lyautey, French Morocco, February 1944

BuNo 08437/14 was the other VP-63 PBY-5 involved in the detection and sinking of U-761 on 24 February 1944. Unlike BuNo 08245/15, it was painted in the early Blue Grey over Light Grey camouflage scheme, and also had an ASB type radar with a hull-mounted rotatable antenna located forward of the hull number. After returning home in June 1945, BuNo 08437 saw service as a trainer with both Operational Training Unit VPB2 No 1 at Jacksonville and VN18D8-B at Corpus Christi, before being stricken on 30 April 1946.

21

PBY-5A BuNo 48318 of VPB-63, Port Lyautey, French Morocco, late 1944

Arriving at Port Lyautey on 23 June 1944, BuNo 48318 was one of eight PBY-5As transferred to VP-63 in the summer of 1944 – these aircraft were assigned side numbers ranging from '16' to '23'. The PBY is depicted here in late 1944 in the ASW Scheme I, which consisted of Dark Gull Grey upper surfaces and Light Gull Grey sides over a white bottom. In January 1945, BuNo 48318 was one of four squadron PBY-5As detached to Uppottery, in Devon, for MAD operations in the English Channel. Whilst in the UK it received the RAF-style side letter 'R' in lieu of the number '18'. On 30 April 1945, the aircraft attacked and sank U-1107 with retro-bombs in the Bay of Biscay. This vessel was the last German U-boat to be sunk by a PBY of the US Navy. When VPB-63 returned home in June 1945, its PBY-5As were transferred while en route to VPB-73 in San Juan. In June 1947 this aircraft was assigned to the Naval Air Reserve Training unit in Dallas, Texas, until stricken on 31 August 1948.

22

PBY-5A BuNo 34047 of VPB-63, Upottery, UK, January-June 1945

BuNo 34047 was also detached from VPB-63 to Upottery in early 1945, and the aircraft is painted in ASW Scheme I camouflage. As was customary with US Navy aircraft working under British command in England, its side number '21' has been replaced with the RAF-style letter 'U', which is the 21st letter of the English alphabet. The number '21' was retained, however, under the port wing. Like the rest of the PBY-5As operated by VPB-63, BuNo 34047 was left behind in San Juan when the squadron returned to the USA post-war. Following an overhaul here, it was assigned to NAS Coco Solo. After returning to the USA in April 1948, the PBY spent time with the Naval Air Reserve Training unit in Atlanta, Georgia, before being stricken in Seattle, Washington, in June 1953 for reduction to spares and produce. On 23 October 1953 BuNo 34047 was one of three PBY-5As offered for sale by the Navy Supply Depot in Seattle and sold for just $150 to Leo Demers of Salem, Oregon, who had it registered as N4939V. A Certificate of Airworthiness was apparently never issued, so BuNo.34047 was probably cannibalised for spare parts.

23

PBY-5A BuNo 2468 *Hangar Queen* of VP-94, Natal, Brazil, 1943

Originally issued to VP-83 in January 1942, BuNo 2468 was damaged in a water landing in Norfolk shortly thereafter. After being repaired, it was assigned to VP-94, but the PBY appears to have spent a good part of its career with maintenance units. VP-94 turned the aeroplane over to Hedron 5 in the summer of 1943, after which it was assigned to FAW 7's Hedron and flown to England, where it was based in Dunkeswell and assigned to the Hedron's Base Unit there. Here, on 22 March 1945, BuNo 2468 was destroyed when an RAF Vultee Vengeance on loan to the US Navy crashed into it on take-off.

24

PBY-5A BuNo 46487 of VPB-6(CG), Bluie West 1, Greenland, November 1945

BuNo 46487 was one of ten new PBY-5As assigned to VP-6(CG) in early 1944. In the summer of 1944, BuNo 46487 and a second PBY-5A detached to the Canadian Arctic to provide ice reconnaissance and air coverage for vessels operating in Hudson Bay and off the coast of Labrador during the navigation season in these waters. On 2 November 1945, BuNo 46487 was damaged beyond repair when it ran off the runway at BW-1 and down the rough terrain of the embankment when a brake pedal broke whilst taxiing.

25

PBY-5A BuNo 46492/4 of VPB-45, Belém, Brazil, December 1944

BuNo 46492 was one of 12 new PBY-5As issued to VP-45 when the squadron reformed in January 1944. From April 1944 through to May 1945, the squadron deployed to Brazil, with BuNo 46492 being VPB-45's last aeroplane to depart Belém and return to Norfolk on 2 June 1945. When VPB-45 was disestablished three days later, BuNo 46492 was transferred to the Coast Guard and issued to the Coast Guard Air Station in Salem, Massachusetts. The PBY was still in Coast Guard service in the early 1950s, but its ultimate fate is unknown.

26

PBY-5 BuNo 04480 of VP-53, Trinidad, 8 March 1943

BuNo 04480 was one of the first three PBY-5s delivered to the newly-formed VP-53 at Norfolk, Virginia, being assigned the side number '53-P-1'. The following July VP-53 transferred to Key West and thence to Trinidad. It was from the latter location that Lt(jg) John E Dryden sank U-156 on 8 March 1943 while flying BuNo 04480/1. This aeroplane was unusual in that it was one of at least two squadron aircraft painted white overall – a colour scheme that had been authorised for FAW 7 aircraft operating in the North Atlantic. When VP-53 received orders in July 1943 to reform in San Diego for Pacific duty, BuNo 04480 transferred to Corpus Christi, where it remained as a trainer until stricken in May 1947. After being surplused, the aeroplane was civilianised as N1096M and operated by *La Legión Caribe* (Caribbean Legion) – a group of Latin American reformists who plotted to overthrow dictatorships in several Latin American countries, including the Dominican Republic. On 19 June 1949, N1096M was attacked and shot up by Dominican Air Force aircraft whilst on the water off Luperon, in the Dominican Republic, during a failed invasion attempt.

27

PBY-5A BuNo 48313/27 of Free French Squadron VFP-1 (6 FE), Agadir, French Morocco, 1943-44

BuNo 48313 was one of 15 PBY-5As delivered to the Free French patrol squadron VFP-1 (*6ème Flottille d'Exploration*), established in Norfolk on 15 September 1943. The squadron duly deployed to Agadir in February 1944. This aircraft apparently suffered a ground mishap of some kind in Casablanca in April 1944 and was subsequently stricken.

28 (planform)

PBY-2 BuNo 0474/31-P-9 of VP-31, Coco Solo, Panama Canal Zone, 1938

Until the end of 1940, aircraft of the US Navy had become probably the most colourful military aeroplanes of the day. Wing uppersurfaces of all tactical aircraft were painted Chrome Yellow, with a chevron in the section colour, while all metal surfaces were finished in aluminium paint and fabric surfaces painted in aluminium dope. Engine cowls were painted to show both the section the aircraft was assigned to and its position within the section. Section Leader aircraft had a band in the section colour painted around the rear hull. The rudders and elevators of PBYs were also colour-coded with stripes and checks in various colours and combinations to denote which wing and squadron the aircraft was assigned to. Seen here in this colourful paint scheme is VP-31's PBY-2, BuNo 0474. When the squadron re-equipped with PBY-5s in July 1941, BuNo 0474 was sent to Jacksonville as a trainer. In January 1943 it transferred to Pensacola, serving with training squadron VN8D8-B at Bronson Field until stricken on 28 February 1945.

SELECTED BIBLIOGRAPHY

Balchen, Bert, *Come North With Me* (autobiography). Hodder & Stoughton, Norwich, England, 1959

Blair, Clay, *Hitler's U-Boat War - The Hunters, 1939-1942.* Random House, New York, NY, 1996

Blair, Clay, *Hitler's U-Boat War - The Hunted, 1942-1945.* Random House, New York, NY, 1998

Creed, Roscoe, *PBY, The Catalina Flying Boat.* Naval Instutute Press, Annapolis, MD, 1985

Crocker, Mel, *Black Cats and Dumbos. World War 2's Fighting PBYs.* Tab Books Inc, Blue Ridge Summit, PA, 1987

Glines, Carrol V, *Bernt Balchen, Polar Aviator.* Smithsonian Institution Press, London and Washington, 1999

Hendrie, Andrew, *Flying Cats. The Catalina Aircraft in World War 2.* Airlife, Shrewsbury, England, 1988

Kinzey, Bert, *PBY Catalina in detail & scale.* Squadron/Signal Publications, Carollton, TX

Scarborough, William E, *PBY Catalina in Action.* Squadron/Signal Publications, Carollton, TX

Scarborough, William E, Walk Around PBY Catalina. Squadron/Signal Publications, Carollton, TX

Wagner, Ray, *The Story of the PBY Catalina.* Flight Classics, San Diego, CA, 1972

Wagner, William, *Reuben Fleet and The Story of Consolidated Aircraft.* Aero Publishers, Inc, Fallbrook, CA, 1976

INDEX

References to illustrations are shown in **bold**. Plates are shown with page and caption locators in brackets.

Affleck, HMS 71
Allen, Lt(jg) Eugene T 'Gene' **52**
Anthony, HMS 70
Auslander, Lt(jg) Stanley E 60, **61**

Baependy 56
Baker, Lt(jg) Howard J **70**, 70
Balchen, Lt Col Bernt 75, 76, 77, 78, 79, **80**, 80
Balsam, HMS 64
Beach, Lt(jg) Joseph W **53**, 53
Bideford, HMS 68
Bismarck 27–28
blimp, K-type **70**
Boeing B-17E *My Gal Sal* **76**, 76, 77
Boeing B-17F 42-5088 78, 79
Bradford Jnr, Lt(jg) Gerard 56, 57, **59**, 59
Brageland, MS 57
Brasileira, Força Aérea 59, 61
Brown, AMM1c Earle E **80**

California, SS 65
Carthen, ARM2c Roy B **47**
Churchill, Winston **27**, 29–30
Clark, ARM2c Richard A **45**
Cole, Lt William **32**
Consolidated Aircraft Corporation 6–7
  Canso 11
  Catalina IB (PBY-5B) **11**
  Commodore (Commercial Model 16-1) **7**, 7
  Corregidor (Model 31) **10**
  Lindbergh Field, San Diego **8**, 8, 9, **10**
  Model 28-2/-5 11
  OA-10B (PBY-6A) 12, **13**
  P2Y-1 Ranger 7; P2Y-2 7, **10**, 14; P2Y-3 **7**, 7, 14
  P3Y-1 (PBY-1) 8
  PB4Y-1 Liberator 58, **61**
  PBY Catalina 6, 7–8, 12; armament **49**, 49–51, **50**, **67**, 67; flight engineer **44**; galley **44**; instrument panel **44**; name adopted 11; radar **15**, **30**, **70**; radio operator's station **26**
  PBY-1 **8**, 8, **14**, 14, **16**, **1**(33, 91)
  PBY-2 **9**, 9, 14, **15**, **16**, **22**, 24, **2, 3**(33, 91), **28**(42, 95)
  PBY-3 **9**, 9, 14, 17, 22, 24, **4, 5**(34, 91)
  PBY-4 9–10, **10**, 11
  PBY-5 11, **19**, **22**, **24**, **27**, **28**; BuNos: 2292 **6**(34, 91–92); 2300 **30**, **8**(35, 92); 2301 **7**(35, 92); 2306 **10**(36, 92); 2323 **17**; 2326/2331/2333 **30**; 2335 **18**; 2337 **30**; 2347 **17**; 2355 **18**; 2358 19–20; 2373 **9**(35, 92); 04480 **25**, 26, **26**(41, 95); 08146 67, **71**; 08157 **71**; 08176 **71**, 71; 08231 68, **69**; 08245 **19**(39, 94), **67**, 70; 08347 **66**; 08349 **66**; 08350 **69**; 08437 **20**(39, 94), **70**, 70; 08439 68, 71; 48313 **27**(41, 95)
  PBY-5A **12**, **20**, **21**, **23**, **24**, **30**, **31**, 31, **13**(37, 93); **72**, 74, **81**; BuNos: 2456 **32**, **11**(36, 92); 2457 **17**(38, 93), 51, **53**; 2458 **31**, **32**; 2459 **12**(36, 92–93), 43–44, **44**, 45, 46, **51**, 51, 53; 2461 31–32, 40, 64; 2464 46, 74; 2466 20, **16**(38, 93); 2468 **23**(40, 94); 2472 56, 57, 58; 2480 56, **57**; 02953 78, 80; 02955 60, **61**; 02972 **14**(37, 93), **75**, **76**, 76–77; 04402 **48**, 48; 7248 **20**; 7263 **18**(38, 93–94), 55, 57; 7273 **4**, 46, 74–75; 7277 21, **15**(37, 93), 78, **79**, 79, **80**, 80; 7279 63, 65; 7300 45, 66; 08037 46, 53; 08039 56, 59; 08095 82, **83**, 83; 08099 58, 60; 34047 **22**(40, 94); 46487 **24**(40, 94–95), 46492 **25**(41, 95); 46522 **25**; 46579 **11**; 48255 **62**; 48318 **21**(39, 94), **70**, 73
  PBY-6A 12, **13**
  San Diego, Lindbergh Field **8**, **11**, **12**
  XP3Y-1 (PBY prototype) 7–8
  XPB2Y-1 **10**
  XPBY-1 **8**, 8
  XPBY-5A **10**, 10
  XPY-1 Admiral **6**, 7
Consolidated/Beriev GST 11
Consolidated/Boeing (Canada): Canso A 11; PB2B-1/2 11
Consolidated/Canadian Vickers: Canso A 11-12; OA-10A 11–12
Consolidated/Naval Aircraft Factory (NAF) PBN-1 Nomad 11, 12
convoys **43**, 43; 'Faith' 65; HX 209: 45; JT 1: 57; ON 182: 51; ON 189: 52–53; ONS 7: 51; OS 51: 64; Russian 46; SC 94: 43; SC 113: 47–48; SL 132: 64; TAW 15: 25; TJ 1: 60; TJ 2: 60; TJ 12: 61; TR 1: 58
Cook, Adm A B **10**

Decatur, USS 74
Dönitz, Admiral Karl 19, 43, 45, 51–52
Dryden, Lt(jg) John E 'Duke' **25**, **26**, 26, 95
Duchess of York, SS 65
Dunlop, Lt Bernard W 78, **79**, 79, **80**, 80, 93
Dyer, Ens Bradford M **45**

Eugene V R Thayer 55

Ford, Lt(jg) William R 'Bill' 19, **57**, 57, 58, 94
French Patrol Squadrons: VFP-1 (*6ème Flotille d'Exploration* - 6 FE) **27**(41, 95), 66, 73; VFP-2 (8 FE) 73

Gallery Jnr, Capt (later Rear Adm) Daniel V 44, **45**
Gibraltar 'fence' **69**, 69–70, **70**, 71, **72**
Goldsmith, Flight Surgeon L H **52**
Greenling USS 20
Greer, USS 30

Hayward, Lt Cdr Alexander S **45**, 63
Heffner, ARM1c Marlin V **80**
Henderson, Ens Frank J 78, **80**, 80
Higbee, Lt(jg) Joseph 82, **83**, 83
Hill Luce, Lt Harvey **48**, 48
Hopgood, Lt(jg) Robert B 43–45, **45**

Icarus, USCG Cutter 32
'Ice Cap Story, The' 77–80, 93

Jädike, Matrosengefreiter Alfred **57**, 57–58
Jenkins, AP1c Henry C **80**

Kearny, USS 30

Laconia, RMS 26
Land, ARM2C W F **26**
Lansdowne, USS 24
Larson, ARM1c Harold A **80**
Le Conquerant 63
Lewis, CAP Arthur Waine **50**, 50

Magnetic Anomaly Detection (MAD) gear 66, **67**, 67, 69–71, **70**, **71**, **72**, 72–73
Martin
  P3M-1/2 7
  PBM Mariner 6, 11, 17, 26, **27**, 27, **30**, 30, 58
Martin, AMM1c D M **45**
Mattingly, AMM3c K A **47**
McCracken, Ens Robert A **45**
Melbourne Star, MS 67
Mignonette, HMS 64, 65
Millard, Lt Robert C **4**, 46, **47**, 47, 50, 51, 52
Milwaukee, USS 55

Neale, ARM1c L M **47**
Northland USS 78
NYRBA (New York, Rio Buenos Aires Line) **7**, 7

Oakville, HMCS 25
Operations: *Bolero* 75–76; *Paukenschlag* (Drumbeat) 19; *Torch* 45, 47, **62**, 62, 93

Pan American Airways **7**, 7, 14, **54**, 54
Parunak, Lt Aram Y 'Dick' **76**, 76, 77, 92
Patton, ARM2c Grant **45**
Port Fairy, SS 65
Presnell, RM2c L L **45**

Ray, Lt William D **72**, 72
Reuben James, USS 30
Richey Jnr, AMM2c Norton J **80**
Robertson, Ens Thurmond E 58–59, **59**
Rochester, HMS 64
Rochester, SS 19
Roosevelt, Capt Elliot **17**
Roosevelt, President Franklin D 14, **27**, 29–30
Royal Air Force **11**, 11, 45, 70

Santa Clara, SS **9**
Schönfelder, Bootsmann Gerhard **57**, 57–58
seaplane tenders 15; *Albemarle*, USS **17**, **27**, 27, **30**, **32**; *Belknap*, USS 27, 28; *Gannet*, USS 29; *George E Badger*, USS 27, 30; *Goldsborough*, USS 29, 30; *Lapwing*, USS **15**, 22, 28, 29; *Thrush*, USS 54
Shevlin, Lt(jg) William A **47**, **51**, 51
Sigurdsson, Ens Orville **53**
Simmons, AMM1c Cornelius **45**
Siren, USS 61
Skaftfellingur 44
Smith, Lt(jg) George S 'Smittie' **47**
Smith, ARM2c J P **47**
Staley, Lt Cdr Poyntell C **52**
Strathella, HMS 82
submarines, Italian 55; *Archimede* 55, 58–59, **59**; *Calvi* 55; *Tazzoli* 56

Terwilliger, S1c Keith L **45**
Thompson, Lt Cdr Warren R **52**
Torny 24

U-boats 19, 20, 25, 26, 43, 48–49; Group *Neuland* 22, 26; *Luchs* (Lynx) 'wolfpack' 45; U-94 25; U-106 19; U-126 56; U-135 64; U-153 24–25; U-154 61; U-156 **25**, **26**, 26, 95; U-159 26; U-161 56–57; U-164 57, 94; U-171 **24**; U-174 56; U-176 57; U-185 63; U-193 64; U-194 53; U-199 61; U-257 45; U-262 68; U-352 31–32; U-359 26; U-388 **52**, **53**, 53; U-392 **71**, 71; U-402 21; U-408 **4**, 46–47, **47**; U-447 64; U-464 43–44, 45; U-467 51; U-503 31; U-505 25; U-506 24; U-507 23–24, 55–56, 57, 58; U-528 **51**, 51; U-535 52; U-541 **72**; U-582 45; U-590 60, **61**; U-592 48, 51; U-602 45; U-613 46; U-619 45; U-631 48; U-640 51, 74; U-656 31; U-662 60–61, **61**; U-664 46; U-731 51, **71**, 71–72; U-752 63; U-759 26; U-760 68; U-761 **67**, **70**, 70–71, 94; U-960 72; U-1107 **70**, 73, 94; 'wolfpacks' 43, 45, 46
United States Army Air Corps 19, 20; 21st Reconnaissance Squadron 14
United States Brazilian Aviation Training Unit (USBATU) 61
United States Coast Guard 52, 80, 81; VP-6(CG) (later VPB-6(CG)) **24**(40, 94–95), 50, **81**, 81–82
United States Navy
  Atlantic Fleet 13, 17–18, 26; Patrol Force 15; Support Force 27
  Hedron 7 Iceland Detachment 82, **83**
  Neutrality Patrol **10**, 11, 13, **14**, 14
  Patrol Wings (later Fleet Air Wings): PatWing 1: 13;
  PatWing 2: 10, 13; PatWing 3: 13, 14, 17, 18; PatWing 4: 13; PatWing 5: 13, 15, 17, 18, 27; PatWing 7: 17, 18, 27, 31, 32, 43; PatWing 8: 15, 17, 18; PatWing 9: 18, PatWing 10: 10
  squadrons: VB-105 **61**; VB-126 (formerly VB-93) **15**(37, 93), **79**, 80–81; VJ-4 **24**; VJ-16 **25**; VN8D8-A **24**, 24; VN-15 **22**; VP-1 (later VP-21; VP-101) 10; VP-5 **4**(34, 91); VP-6F 8; VP-7 9; VP-9 **9**; VP-11F 9; VP-12 (later VP-51) **8**; VP-13 **10**; VP-14 68; VP-18 (later VP-25; VP-102) 10; VP-21 (later VP-101) 9, **10**; VP-22 9; VP-31 **9**, 14, **15**, 17, **21**, 22, 25, **3**(33, 91), **13**(37, 93), **28**(42, 95); VP-32 9, 14, 17, 22–23, 24–25, 26; VP-33 14, 26, **5**(34, 91); VP-34 26; VP-43 (later VP-81) 15; VP-45 (later VPB-45) 61; VP-51 (later VP-71) **14**, 14, 17, 18, 27, **1**(33, 91), **10**(36, 92); VP-52 (later VP-72) 17, 18, 22–23, 26, 27–28, **28**, **6**(34, 91–92), **7, 9**(35, 92), **54**, 54–55; VP-53 (later VP-73) 26, 27, **26**(41, 95); VP-54 14, 27, **2**(33, 91); VP-55 (later VP-74) 27; VP-61 (later VP-82) 15; VP-63 (later VPB-63) **19, 20**(39, 94), **66**, 66–69, **68**, **69**, **70**, 70, **71**, 71–72, **72**; VP-71 (formerly VP-51) **17**, 17, 18, 28–29, 31; VP-72 (formerly VP-52) **17**, 17, **18**, 18, 31; VP-73 (formerly VP-53) 17, **18**, **20**, 20, **30**, 30, **31**, 31–32, **32**, **8**(35, 92), **11, 12**(36, 92–93), **16**(38, 93), **43**, 43–46, **44**, 62, 63, 64, 65, 66, 69, 74; VP-74 (formerly VP-55) 17, 58; VP-81 (formerly VP-43) 17, 18, **19**, 19–20, 22–23, 26; VP-82 (formerly VP-61) 17–18, 31, 32; VP-83 (later VP-107) 18, 19, 20, **18**(38, 93–94), 55, 56–57, **57**, 58–59; VP-84 **4**, 18, 20, **21**, 21, 32, **17**(38, 93), 45, **46**, 46–48, **48**, **49**, 49–50, 51, 52–53, **53**, 74, 82;
  VP-91 18; VP-92 18, **23**, 23, 25, **62**, 62–63, 64, 73; VP-93 (later VB-126) 32, **14**(37, 93), **46**, **75**, **76**, 76, **77**, 78, **80**, 80; VP-94 **23**(40, 94), 58, 59–61; VP-107 (formerly VP-83) 59; VP-201 26; VPB-45 (formerly VP-45) **25**(41, 95); VPB-63 (formerly VP-63) **21**(39, 94), **22**(40, 94), 66, **71**, **72**, 72–73
  VPB-2 Operational Training Unit **22**

Vano, HMS 71
Vasu, AMM1c John **47**, 49–50
Vought O2U **6**

Walsh, Lt(jg) James J **47**
Waters, Lt(jg) Nathan F **80**
Wishart, HMS 70
Wood, Lt Everett W 'Woodie' 51, **52**, **53**, 53
Woolley, Lt(jg) Thomas R **67**, 70

Related Titles

ISBN	SERIES	No.	TITLE
1 85532 689 2	Combat Aircraft	3	Helldiver Units of World War 2
1 85532 732 5	Combat Aircraft	10	SBD Dauntless Units of World War 2
1 85532 781 3	Combat Aircraft	11	B-24 Liberator Units of the Pacific War
1 85532 901 8	Combat Aircraft	15	B-24 Liberator Units of the Eighth Air Force
1 85532 902 6	Combat Aircraft	16	TBF/TBM Avenger Units of World War 2
1 84176 024 2	Combat Aircraft	19	Sunderland Squadrons of World War 2
1 84176 025 0	Combat Aircraft	20	TBD Devastator Units of the US Navy
1 84176 383 7	Combat Aircraft	34	PV Ventura/Harpoon Units of World War 2
1 84176 581 3	Combat Aircraft	40	PBJ Mitchell Units of the Pacific War
1 85532 545 4	Elite	60	U-Boat Crews 1914–45
1 84176 363 2	New Vanguard	51	Kriegsmarine U-boats 1939–45 (1)
1 84176 364 0	New Vanguard	55	Kriegsmarine U-boats 1939–45 (2)
1 84176 312 8	Warrior	36	Grey Wolf: U-Boat Crewman of World War II
1 84176 327 6	Warrior	37	German Seaman 1939–45
1 84176 872 3	General Military		Wolf Pack: The Story of the U-Boat in World War II

Visit the Osprey website

- Information about forthcoming books
- Author information
- Read extracts and see sample pages
- Sign up for our free newsletters
- Competitions and prizes

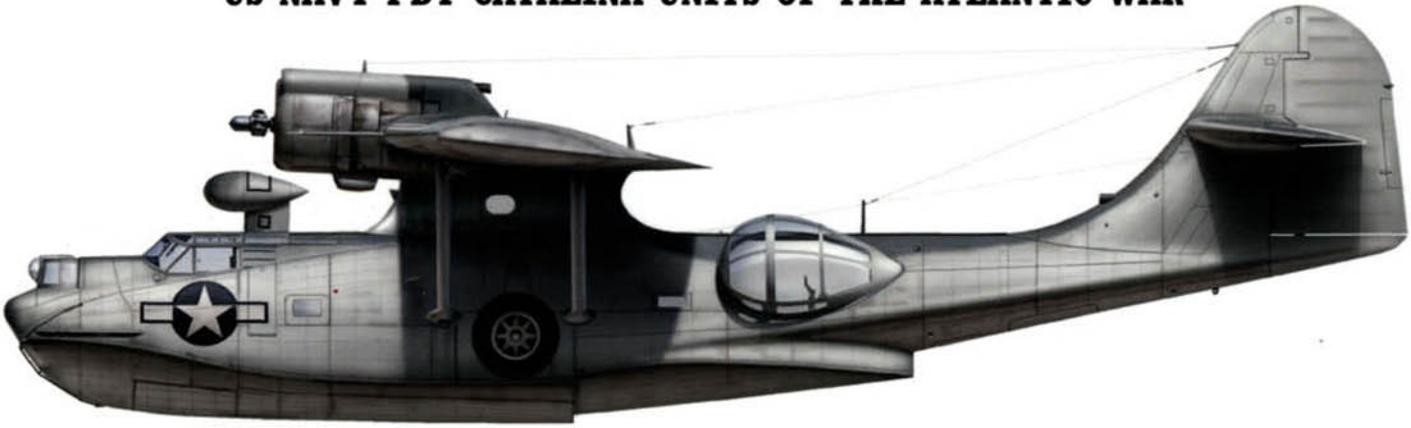
'Richthofen's Circus'
F-15C/E Eagle Units of Operation Iraqi Freedom

www.ospreypublishing.com

To order any of these titles, or for more information on Osprey Publishing, contact:
Osprey Direct (North America) *Toll free:* 1-866-620-6941 *Fax:* 1-800-659-2436 *E-mail:* info@ospreydirectusa.com
Osprey Direct (UK) *Tel:* +44 (0)1933 303820 *Fax:* +44 (0)1933 443849 *E-mail:* info@ospreydirect.co.uk
www.ospreypublishing.com

OSPREY COMBAT AIRCRAFT • 65

US NAVY PBY CATALINA UNITS OF THE ATLANTIC WAR



From the Arctic to the equator, PBYs of the US Navy patrolled both sides of the stormy Atlantic alongside their Allied counterparts, escorting merchant shipping through submarine-infested waters, protecting this crucial lifeline from the United States to Great Britain. Arguably the PBY was the most successful flying-boat ever designed, serving with all four branches of the US military. It was the primary long-range patrol bomber in the US Navy's inventory when the United States entered World War 2, and despite being obsolete, it would serve in significant numbers until the war's end. Its contribution to victory was invaluable. Although the number of ships and lives saved by the mere presence of PBYs over convoys will never be known, in the process, US Navy PBYs sank 19 Axis submarines in the Atlantic Ocean – more than half the total accomplished by Allied PBY Catalina and Canso squadrons.

OSPREY COMBAT AIRCRAFT SERIES

- Comprehensive histories of fighting aircraft and their crews, highlighting their vital role in the development of warfare in the 20th century
- A unique source of information, researched by recognised experts and brought to life by first hand accounts from the combat veterans themselves
- Concise, authoritative text is supported by at least 30 original colour artworks, specially commissioned scale drawings, and the best archival photography from around the world

OSPREY
PUBLISHING

US $20.95 / $27.95 CAN

ISBN 1-84176-910-X